THE LONDON JOURNAL OF Arts and Sciences;

CONTAINING

FULL DESCRIPTIONS OF THE PRINCIPLES AND DETAILS OF

EVERY NEW PATENT,

ALSO

Original Communications

ON OBJECTS CONNECTED WITH

SCIENCE AND PHILOSOPHY,

PARTICULARLY SUCH AS EMBRACE THE MOST RECENT

INVENTIONS AND DISCOVERIES

IN

Practical Mechanics.

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AND BY C. F. PARTINGTON,

OF THE LONDON INSTITUTION.

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No. I,

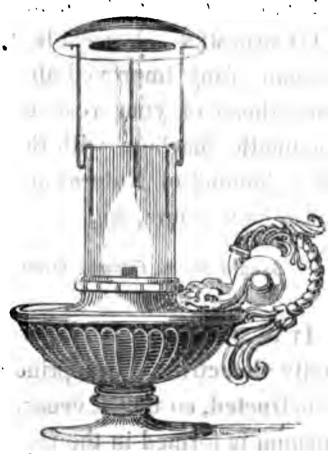
[SECOND SERIES.]

Original Communications.

ART. I.—ON SMOKE CONSUMERS.

(In a Letter communicated to the Editors.)

GENTLEMEN.—Your readers will probably recollect, that an ingenious foreigner, some years back, invented an apparatus called a *Perdifume*, for a smoke consumer, and if I recollect right, it was suspended by a chain from the ceiling of the apartment in which it was intended to be employed. Agreeable to my promise of furnishing all the useful novelties of this metropolis, I now enclose a sketch of an apparatus that is to be found in the *boudoir* of almost every Parisian blue-stocking. It is infinitely superior to De Boffer's suspended bell, and its figure and arrangement may be thus illustrated.



The value of the Argand lamp consists in the immense supply of oxygen that is at once brought in contact with the burning hydrogen produced by the decomposed oil. Now the atmosphere, even in its most quiescent state, is continually agitated by the opening and shutting of doors, and these aërial currents, prevent the proper supply of oxygen to the flame, by disturbing the "draft," as it is technically called, so that the real use of this contrivance, as well as De Boffer's cumbersome apparatus, is to insure a free and uninterrupted current, by preventing the downward rush of air, that would otherwise attend any accidental disturbance... The apparatus is sold, independent of the lamp, from one to three francs. I shall take an early opportunity of furnishing you with a review of the present state of scientific instruction in France, and remain, Yours, &c.

Paris, February 27th. B.

ART. II —DESCRIPTION OF A NEW AND VERY PERFECT AIR PUMP, INVENTED BY MR. WILLIAM STILES.

To the Editors of the London Journal of Science, &c.

GENTLEMEN—Agreeable to your wish, I forward an account of my improved air pump, but must beg leave to refer those of your readers who wish to compare my pneumatic machine with the apparatus in general use to the "Manual of Natural and Experimental Philosophy," and remain yours, &c.

WILLIAM STILES.

Seward Street, Goswell Street.

IT is well known that the common air pump is materially defective in the principle on which its valves are constructed, so that it ceases to operate long ere a perfect vacuum is formed in the receiver, such however is not the

case in this pump, which unites in a very eminent degree, all the advantages of those that have hitherto been constructed, with the very important desideratum of performing exactly twice the work of a common double barrelled apparatus.

Plate I, fig. 1, represents a section of the principal parts of the pump, from which it will be seen, that it is worked in the usual way, by means of a winch, with a wheel and racks, this part therefore requires no explanation. But to the end of each rack is firmly attached, by means of the connecting pieces of brass marked *a*, *a*, the cylindrical rods *b*, *b*, passing the collars of leather *c*, *c*, which have reservoirs of oil in the cups above them, for the purpose of more effectually rendering them air-tight. The pistons *d*, *d*, are solid, having no valve in them, and consists of disks of leather, steeped in oil and tallow, and screwed up fast between their shoulders, they are then turned to fit the bore of the barrels.

The positions assumed by them, as shewn in the section must next be attended to. The one in barrel A, is shewn nearly at the end of its ascending stroke, while the piston in barrel B, is equi-distant from the bottom in its descending motion; the piece C, is fitted in between the caps which contain the collars of leathers, and is screwed firmly to them. The barrel B, is withdrawn from its cap E, in order to explain the mode of connexion between the cap and the barrel, as each cap D, and E, are similarly fastened by screws, placed at convenient distances to the flanges of the respective barrels A, and B. The angular perforated passages *e*, *e*, as seen in the piece C, communicate with the main inlet pipe, or passage, from the receiver, the one leading into barrel B, is seen open and allows a free and unobstructed way for the air to

enter above the piston *d*, in its descending stroke, as marked by the darts pointing downwards, while the air is also passing down the pipe *f*, and through the horizontal way or channel communicating with barrel *a*, as shewn by the letters *f*, *f*.

Here the air passes through an oiled silk valve, which consists of a brass valve piece, having a hole perforated through its centre, and a small groove or nick cut in the upper part, a piece of oiled silk is strained over its surface, and secured by silk thread twisted round in the groove; this piece, with the valve, is shewn in the bottom of barrel A, opening upwards, permitting the air to enter beneath the piston in its ascending motion, as shewn by the darts pointing in that direction. Having thus traced the inlet ways to the top of barrel B, and bottom of barrel A, we may now describe the mechanism by means of which the top inlet valves are connected with their respective barrels. The valves we are now about to describe, consist of the two metallic cylinders F, and G, the first being closed, and G, which is shewn open; the rods or cylinders pass through the small collars of leather, *g*, *g*, with an oil cup to each cap, as shewn by the curved lines above them, which caps may be screwed up when requisite, in order to press the collars of leather closer, and render them air-tight, the cylindrical valves or rods are kept in the vertical position, by passing through a piece of brass, which is attached by means of screws to the under side of the head of the pump marked H, to this piece are attached two levers I, and K, revolving upon the steel pins of the milled head nuts *h*, *h*. The levers work in a mortise, cut to receive them in that part of the piece *h*, shewn by the letters *i*, *i*; attached to one end of each of those levers, are seen the small steel screws *k*, *k*. Two

small plates of brass *l*, *l* (the front plate of each being only seen in the section) whose extremities are again attached by the screws *m*, *m*, to the pieces *n*, *n*, answer the purpose of sling rods for connecting the motion here requisite for raising and depressing the cylinders or valves according to the alternate motion of the levers I, and K. The pieces *n*, *n*, are perforated, and slide freely on the valves F, and G. The way in which this alternate motion takes place, may easily be explained. On the back part or opposite edge, of each toothed rack, as seen in fig. 2, is placed a plate of steel (fastened by small screws) the length of which is limited by the working stroke of each piston, and projects on that side of each rack on which the levers are represented. The lever K, is shewn in the position with the valve G, open, for permitting the air from the receiver to enter the top of barrel B, and the bottom of barrel A, as before described, while the lever *l*, with the valve F, is seen as thrown down, closing the top inlet of barrel A, we shall now suppose the piston of barrel B, to conclude its descent to the bottom, having expelled the air beneath, through the outlet valve *s*, and the piston of barrel A, its ascent to the top of its barrel, the rods and racks will also pass through the same space, and the moment the pistons reach their respective limits, the levers I, and K, are relieved from the opposite ends of the plates or fillets of steel, the lever I, by the action of the spiral spring Q, which is coiled round the cylindrical valve F, and pressing between the turned shoulder *p*, and the under side of the perforated or sliding piece *n*, is then returned to an horizontal position. The lever K, by a like action, produced by the spring *q*, which is also coiled round the cylindrical valve G, and pressing between the piece of brass *h*, and shoulder piece *n*, closes the cylindrical valve G, by its pressure, and its lever K, of course

takes an horizontal position, by reversing the motion of the winch for the next stroke of the pistons, the positions of those levers are again changed by the ends of the fillets of steel, placed on the back edge of the racks, coming in contact with their extremities. The lever I, is thrown up in the direction of the dotted lines, carrying with it the cylindrical valve F, which is consequently opened, and a free access for the air to enter the barrel A, above the piston D, on its downward motion, now takes place, the valve F, placed at the bottom, closes, and the air received by it is expelled through the valve *s*, which is similar in construction with the valve F, but in this case opens outwards, while the lever K, in consequence of the ascending motion of the rack, and the fillet of steel, must come in contact with its extremity, and is thrown down on the spiral spring *o*, coiled round the cylindrical valve G, which still more effectually secures the valve in this position, the return of the air by the upward motion of the piston being also prevented. The lever K, will now be in the position shewn by the dotted lines, and the air received above the piston in its former downward stroke, is thus expelled through the top outlet valve *t*, and passes through the side, or leading off pipe L, in the direction as shewn by the darts pointing downwards, and which communicates with the same general outlet as the bottom discharging valves *s*, *s*. A reference to the above description will show, that while one barrel is discharging its contents by the upward motion of its piston, it is at the same time filling to discharge by the downward stroke. The other barrel is discharging by the downward action of the piston, and also filling through the ways described, to discharge again by its upward motion, so that it performs the work of two pumps of the same capacity of barrel, constructed on the common principle.

In addition to the above advantages, the mode of working the top inlet valves mechanically, insures a much more perfect vacuum than could otherwise be obtained. Thus, if we suppose the bottom inlet valves *f*, *f*, and also the discharging valves *s*, *s*, to have become leaky, by simply turning off the cock M, we cut off all communication between them and the receiver, the pump then becomes a single acting pump, with all the advantages of the common instrument. If we now suppose the top valves to be bad, in order to cut them off, detach the centre screws *h*, *h*, from the levers I, and K, permitting those parts to hang down loose by the sides of the cylindrical valves, the spiral springs *q*, *q*, will then press those valves close down over the top angular inlet ways, and prevent the access of air from the receiver above the piston. If we then open the cock M, which in the former case was closed, the pump may be worked from the bottom set of valves alone.

ART. III.—OPTICAL AMUSEMENTS.

(From a Correspondent.)

To the Editors of the London Journal of Science, &c.

GENTLEMEN,—As I find that your object is to familiarize scientific truths, and to use a homely phrase, make useful knowledge available to "the vulgar," I readily furnish my quota to so laudable an undertaking. As I have paid particular attention to optical science, with reference to the amusement to be derived from its pursuit, I cannot do better than commence my papers by furnishing a series of curious optical experiments, which may be performed without costly apparatus.

A curious optical deception may be thus produced. It is to exhibit an erect object, which, when placed near a hole in a card, will appear to be on the other side, and

also inverted and magnified. Let a card be perforated with a small hole, and placed opposite a white wall or window, the eye of the observer being situated on the other side of the card. A pin being then placed between the eye and card, will be seen on the other side of the aperture, inverted and magnified as already described. The reason of this is, as M. Le Cat has observed, that the eye in this case sees only the shadow of the pin on the retina, and since the light which is stopped by the upper part of the pin or its head, comes from the lower part of the white wall or window, whilst that which is stopped by the lower end of the pin comes from the upper part, the shadow must necessarily appear inverted with respect to the object. The accidental variations of the temperature of the air, at different depths, produce great irregularities in its refraction, especially near the horizon. The most remarkable of these is occasioned by the refraction of the air in the neighbourhood of the surface of water, of a building, or of the earth itself, in consequence of which a distant object appears to be depressed, instead of being elevated, and is sometimes seen at once both depressed and elevated, so as to appear double, one of the images being generally in an inverted position, as if the surface possessed a reflective power; and there seems indeed to be a considerable analogy between this kind of refraction and the total reflection which happens within a denser medium. These effects are known by the appellations *looming*, *mirage*, and *Fata Morgana:* they may be very completely imitiated, as Dr. Wollaston has shown, by looking at a distant object along a red-hot poker, or through a saline or saccharine solution with water, and spirit of wine floating on it. The effect of refraction on the apparent places of terrestrial objects must be frequently disturbed by circumstances of this kind; but its magnitude is usually about one tenth

of the angular distance of the object, considered as a part of the earth's circumference.

The following experiment which illustrates in a pleasing manner, the actual formation of haloes, has been given by Dr. Brewster. Take a saturated solution of alum, and having spread a few drops of it over a plate of glass, it will rapidly crystallize in small flat octohedrons scarcely visible to the eye. When this plate is held between the observer and the sun, or a candle, with the eye very close to the smooth side of the glass-plate, there will be seen three beautiful haloes of light, at different distances from the luminous body. The innermost halo, which is the whitest, is formed by the images refracted by a pair of faces of the octohedral crystals, not much inclined to each other. The second halo, which is more beautifully coloured, with the blue rays outwards, is formed by a pair of faces more inclined; and the third, which is very large and highly coloured, is formed by a still more inclined pair of faces.

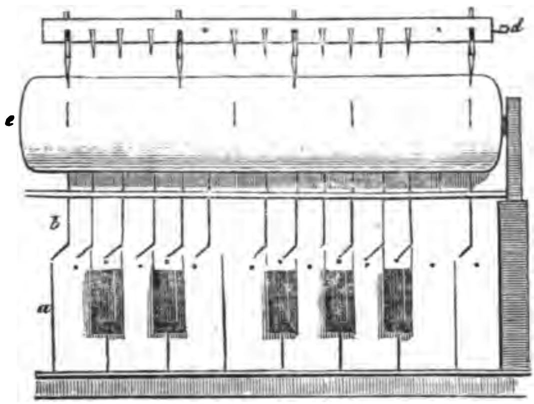
Each separate crystal forms three images of the luminous body, placed at points 120° distant from each other, in all the three haloes; and as the numerous small crystals have their refracting faces turned in every possible direction, the whole circumference of the haloes will be completely filled up. The same effects may be obtained with other crystals, and when they have the property of double refraction, each halo will be either doubled, when the double refraction is considerable, or rendered broader, or otherwise modified in point of colour, when the double refraction is small. The effects may be curiously varied, by crystallising, upon the same plate of glass, crystals of a decided colour, by which means we should have white and coloured haloes succeeding each other.

Your's, &c. OPTICUS.

Art. IV. A Machine for the purpose of perpetuating extempore compositions for a keyed Musical Instrument. By J. H. Vinnicombe.

To the Editors of the London Journal of Science, &c.

Gentlemen—Having observed the very curious way by which music is set, or marked on a barrel organ, I was led to believe that by a similar method any extemporaneous performance on a keyed instrument might be perpetuated.



I think the above engraving will explain my idea, I have supposed only one octave, but it is evident the same process may be carried to any required compass.

Let *a*, be the keys of the instrument ; *b*, a lever or pointer communicating with the key on which it is placed, *c*, another lever or key of metal being made flat and thin so as to work freely in the grooves of the beam, which should be faced with metal, the wire *d*, passing through the whole range of keys having fixed at their extremities any substance that will give a distinct mark not quickly weaving away ; or ink may be caused to flow through a small groove similar to the contrivance in a music ruler.

Between the two sets of keys is placed, the cylinder *e*, which, should be what is called a spiral barrel revolving in such a manner as to admit of two or three turns, the marks of the last not interfering with those of the first.

At the commencement of the performance, the cylinder is made to revolve in a regular and even manner, the performer pressing the keys in the usual way, as each key is put down, it will elevate the corresponding lever, and the latter communicating its impulse to the corresponding upper key, will depress the marker on the cylinder, leaving a line which will have the same ratio with the length of time, the key is kept down by the performer. At the end of the piece if the cylinder be taken out and pinned, a regular set of keys may be put in place of those used, for the marking (or it may be put in another instrument whose keys exactly correspond) it will produce with very little variation the same music previously performed. It will be obvious that it is immaterial whether the music be extempore or written, and Maelzel's "metronome" being used, any proportions of time may be observed.

Yours, &c. T. H. VINNICOMBE.

ART. V.—IMPROVED MANUMOTIVE PRINTING MACHINE, INVENTED BY MR. M. H. SHUTTLEWORTH, FROM THE MODEL EXHIBITED AT THE LONDON INSTITUTION, ON WEDNESDAY EVENING, MARCH 5.

FEW of the mechanical arts seem to have made such rapid progress since the commencement of the present century, as that of printing. For many hundred years after the invention, little however seems to have been attempted in point of improvement, and nothing discovered of material use ; indeed, in all the essentials of print-

ing, many of the earlier productions of the press equal any thing that has since been produced.

The late Mr. William Nicholson, of London, was, it is believed, the first who proposed the introduction of a machine for printing, which should supersede entirely the ordinary press. He obtained a patent, dated the 29th of April, 1790, "for a machine or instrument for printing on paper, linen, cotton, woollen, and other articles, in a more neat, cheap, and accurate manner, than is effected by the machines now in use." The ink was supplied by a cylinder or roller, covered with soft skin, and stuffed with hair or wool, and the quantity was regulated by smaller cylinders, which acted so as to distribute it equally upon the larger one. This last part of Mr. Nicholson's invention, however, or the idea of inking the types in printing, by means of a roller, in place of the balls formerly used, has been since improved upon, and is now universally adopted.

To understand the arrangement of the present press, which differs in many respects from any that has preceded it, we need only refer to Plate 1, fig. 3, in which, 1, represents the frame and bed.

2, The wheel and pinion which is made to produce a continuous rotatory motion, by the different diameters of the two sides of the wheel.

3, The inking slab.

4, The traversing frame, containing, A, B, the inking rollers; C, the press roller; and D, E, screws to regulate the pressure of the rollers.

5, to 11, Conducting drum and cylinders.

12, to 15, Tapes for conducting papers.

Recent Patents.

To Maurice de Iongh, *of Warrington, in the County Palatine of Lancaster, Cotton Spinner, for his Invention of certain Improvements in Machinery, or Apparatus for Preparing, Roving, and for Spinning, Twisting, and Winding Fibrous Substances.*—[Sealed 18th December, 1826.]

In the thirteenth volume of our first series of the London Journal of Arts, we described the very ingenious combination of machinery, invented by Mr. de Iongh to effect the various evolutions of a self-spinning mule, to be actuated solely by the power of steam, instead of the ordinary mule, which is principally directed by manual and mental labour. We then took occasion to mention the importance of stretching and winding the threads or yarns in the spinning mule with great precision, and consequently the talent, and practical knowledge requisite to constitute a skilful spinner.

The present invention is not a mode of spinning without the aid of manual exertion, but a contrivance to be adapted to a spinning mule of the ordinary construction, by means of which an unskilful person, or one who possesses but little knowledge in that art, will be enabled to wind the yarns on to the cops, without the possibility of erring, and with greater exactness, and uniformity than could be attained by the most experienced hand spinner.

The principle feature of this invention is an adjustable guide bar placed under the mule, in a position nearly perpendicular to the front of the mule carriage, upon which guide bar a swivel box connected to the mule, slides as the

mule carriage advances and recedes. This swivel box carries a horizontal rotatory shaft, that indirectly actuates the spindles, by means of a friction wheel affixed to one of its extremities. This shaft is driven by geer, as the carriage travels, and, causes the friction wheel to turn a circular face plate, with which it is in contact, and this face plate being fixed to a vertical axle, the axle is thereby made to revolve, and an endless band passed round a pulley, at its upper extremity by the rotation of the axle, is made to drive all the drums and spindles.

Now as it is necessary to vary the speed of the spindles in winding on the yarns according to the increasing diameters of the cops, by the accumulation of the yarn, and according to the conical figure of the cop. The guide bar above mentioned, is made to shift its situation from a perpendicular to an oblique position, and the horizontal shaft being enabled to elongate and contract, the swivel moving upon the oblique guide bar as the carriage runs in, slides the shaft and friction wheel from a small to a larger diameter of the face plate, and consequently causes it and the spindles to be drawn with a varied speed as may be required.

The patentee has been extremely careful and minute in describing the details of his invention, which appears to present some very important advantages in mule spinning, we are therefore induced to give the specification of this patent in the words of the inventor, presuming that upon this occasion a literal copy of the original document will be more acceptable to our readers, than a condensed report of its general plan, and principle of construction.

" My improvement in machines or apparatus for preparing rovings, and for spinning, twisting, and winding fibrous substances, consist in a new arrangement of mechanism for winding spun yarns, threads, and rovings

on spindles, either naked or covered with spools, or any other coating, which said new arrangement of mechanism is exhibited in Plate II, and will be fully understood by the following description thereof.

Fig. 1, is a plan or horizontal view of a mule-carriage, represented as having only four drums, with a proportionate number of spindles. The upper part of the framing of the said carriage, and the covering boards being removed for the purpose of showing the parts within, and also the principal features of the mechanism which constitute my new invented improvement.

Fig. 2, is a sectional elevation of the mule-carriage taken cross-wise at right angles, a little to the left of the middle of the carriage, and exhibiting also the guide bar, and other parts of the machinery shown in fig. 1. Fig. 3, is a longitudinal elevation of a part of my improvement detached from its place in the inside of the carriage, which is seen also in fig. 1. The same letters denote similar parts in all these three figures.

a, a, a, is the framing of the carriage ; *b, b, b,* are its wheels running on the slips *c, c, c* ;—*d, d, d, d,* the drums turning the spindles *e, e, e,* by means of small endless cords carried round the warves or whirls as usual. These drums are turned in the ordinary way by the drumband pullies *f, g,* and *h,* are the squaring or regulating band pullies, over which pass the squaring or regulating bands *i, i, i,* and *k, k, k,* which said regulating bands cause the carriage, to move in and out, that is, to and fro, on the slips *c, c, c,* preserving its parallelism with the roller beam *i.*

All the foregoing description of machinery, and the motions, are well understood by spinners, being in general use, and form no part of my invention, further explanation is therefore unnecessary, but as some of these parts

are connected with my invention in the way I now work it, I think it desirable to enter thus much into the particulars above mentioned.

Now as the aforesaid squaring band pulleys *g*, and *h*, are turned by the moving of the carriage to and fro, I make their movements subservient to putting in motion my new contrivance in the following manner, namely:—

I mount the squaring band pulleys *g*, (supposed to be nearest the mule head).on an upright arbor or spindle *l*, (see also the detached fig. 3,) which revolves in a step, fixed to the iron that carries the carriage wheels as seen by dots in fig. 2. I further fix on the same arbor a bevel wheel *m*, which works in another bevel wheel *n*, attached at the end of a horizontal shaft *o*, (seen also in fig. 3,) at the reverse end of this horizontal shaft, I fix a friction pulley *p*, working on a face plate *q*. This face plate is attached to an upright shaft or spindle *r*, and on the same spindle, I also fix a pulley *s*, which pulley *s*, is embraced by the drum-bands *j*, *j*, *j*, *j*, or is by other means so connected with the drums or rollers, which actuate the spindles that the rotatory speed of the pulley *s*, will determine the number of revolutions of the spindles.

It will be seen that as the mule carriage travels in towards the roller beam, (which I shall hereafter call "closing in") and in its progress moving over 57 inches, the squaring band pullies *g*, and *h*, will during such closing in make about 1 and 9-10ths of a revolution, (supposing their circumferences to be 30 inches each) and by means of the machinery before described. The spindles being connected with the drums, the drums with pulley *s*, that again, through the face plate *q*, and friction pulley *p*, the bevel wheels *m*, and *n*, and the squaring band pulley *g*, the spindles will be driven a certain number of revolu-

tions, I say that the act of moving in, or closing in (as I call it) will cause the spindles to revolve, and if the bevel wheel *m*, has 58 teeth, *n*, 30 teeth, the pulley *p*, 6 inches diameter working on such part of the face plate *q*, as measures 3 inches diameter, and the pulley *s*, 10 inches diameter, the drums also 10 inches diameter, and the warves or whirls on the spindles 7-8 of an inch diameter, then in such case it will be found upon calculation, and considering the diameters of the different bands, that the spindles will make 78 revolutions, or thereabouts, whilst the carriage closes in. Should it be found that it requires rather too much power for the carriage to drive the aforementioned machinery by the act of going in, as it will be recollected that by so going in the squaring band pulleys must turn, which in this instance becomes a first mover, then the least assistance of the spinner by slightly moving the rim, will remove such difficulty; which any spinner will easily understand.

Now supposing that the said number of revolutions of the spindles be what is required at the commencement of making the cop, then the thread would be wound on properly during this first closing in, and will appear upon the spindle as seen on the first spindle, in fig. 4, from *a*, to *b*. If a greater or less number of revolutions of the spindles, should be required (which depends upon the thickness of the spindles, the diameter of the thread, and the length the carriage comes out whilst spinning; commonly called "The Stretch,") then the aforementioned wheels and pulleys must be varied accordingly, but I will proceed upon the supposition that the said 78 revolutions are right at the first closing in.

After the first closing in the speed of the spindles is not to continue uniformly the same from the beginning to the end of closing in, but at every succeeding going in

of the carriage, they are to commence winding on the yarn at a lesser speed than at the preceeding going in, and gradually increase in speed till at the end of closing in, when the speed of the spindles is again the same as at the end of the preceeding closing in, or thereabouts, I say, "*or thereabouts*," because it is desirable to increase the number of revolutions of the spindles, a little at the end of every succeeding going in, to make the cop have a fine point which I shall hereafter explain.

The reason of this increase of speed during closing in, is because on that part of the cop where the winding on commences, it gets thicker at every succeeding closing in, but where the winding on ends, (which is the point of the cop) it remains at about the same thickness, and this said increase of thickness where the winding on commences, continues till what is called, "The Cop Bottom," is made, which said cop bottom is shaped like two cones united at their bases, as seen on the 6th spindle, fig. 4, and is well understood by spinners.

From the foregoing description it will readily be seen, that if at the commencement of closing in, the friction pulley *p*, works on the face plate *q*, not upon a diameter of 3 inches, but upon a larger diameter, that then the spindles will make less number of revolutions; and it will further be *easily* understood that, if the said pulley *p*, does during the closing in traverse laterally on the face plate *q*, from a larger diameter than three inches, towards the centre till it comes to the three inches diameter, acting all the time upon the face plate, that under these circumstances the spindles will revolve *comparatively* slow at first, and gradually increase in speed to the end of closing in.

If then at every commencement of closing in, the pulley *p*, begins working upon such part or diameter of the

face plate *q*, as the thickness of the cop requires, and during the closing in, traverses till at the end of closing in, it arrives again at where the face plate *q*, measures three inches diameter, the spindles will be made to revolve with such increase of speed, as the winding in of the yarn from the thickest to the thinnest part of the cop requires.

To make this appear still clearer, let us suppose that in six goings in of the carriage the cop bottom be made. During the first going in, the thread is wound on the spindle as from *a*, to *b*, fig. 4, and we will suppose that this required 78 equal revolutions of the spindles which were produced by the friction pulley *p*, acting on such diameter of the face plate *q*, as measures three inches marked 1, fig. 3, during the whole time of the closing in. At the commencement of the second closing in, the winding on takes place higher, as from *c*, to *d*, on the second spindle fig. 4, now as the yarn of the first winding on caused the spindle to be clothed therewith, the winding on of the second going in, consequently commencing on a thicker part, the spindles must therefore revolve at the beginning of closing in proportionately slower, and pulley *p*, must at that time commence operating upon a larger diameter of face plate *q*, as at 2, fig. 3; but the winding on of that second closing in ending also higher on the spindle, than where the first winding on ended, namely at *d*, and which is again on the bare spindle, it is evident that at the ending of the second closing in, the spindles must again revolve at the same rate, as at the ending of the first closing in, and which will be brought about by pulley *p*, being made to traverse on the face plate from 2, to 1, that is from such part of the diameter of *q*, as will cause the spindles to wind on properly at *c*, to such lesser diameter of *q*, as will increase the speed of the

spindles sufficiently when winding on at *d*, on the naked spindle.

At the commencement of the third closing in, the winding on again taking place higher as from *e*, to *f*, on the 3rd spindle, fig. 4, and the part where the winding on commences being thicker, having now two coatings of yarn, the friction pulley *p*, must commence operating on *q*, again on a larger diameter, as at 3, fig. 3, and again traverse during closing in to the three inches diameter of *q*, which is at 1. The cop now assumes more and more a conical shape from the largest diameter to the point, as well by the increased coatings of yarn, or layers, as they are usually called, as by the yarn winding on closer at the thickest part than towards the thinner parts of the cop: and be it here distinctly understood that I do not by this my specification, and by virtue of the patent to which this specification refers, claim to have found out any thing new in the making of a cop, except the manner of winding on, and which said winding on is generally done by the spinner moving the rim. It is therefore unnecessary that I say more of the making of a cop than that at every succeeding going in of the carriage, the yarn is laid on a degree higher than before, and the thread is so conducted as to form the shape of a cop: it is my new mode of winding on which I claim as of my invention.

Now at the fourth closing in, the yarn will be wound on as from *g* to *h*, on the 4th spindle, fig. 4, and upon the same principle as before. The friction pulley *p*, will have to traverse on *q*, from 4 to 1. At the fifth closing in the winding on, will take place as from *i*, to *k*, on the 5th spindle, fig. 4; and pulley *p*, will traverse from 5 to 1, at the 6th closing in the winding on will be from *l*, to *m*, on the 6th spindle, fig. 4, which produces, as before stated,

the cop bottom, during this last going in, p, will have to traverse on q, from 6 to 1.

I repeat that in order to make myself clearly understood, I have supposed that the cop bottom is made in 6 goings in, and that the pulley p, working on the diameter of face plate q, at 6, (being about $17\frac{1}{2}$ inches diameter) will cause the spindles to revolve sufficiently slow, to wind on at the thickest part of the cop, and when working on diameter 1, (being three inches) the spindles to revolve sufficiently fast for winding on the thinnest part of the cop, and which I find in the course of my practice to be the case or thereabouts; namely, that about fourteen revolutions of the spindles, which are produced by pulley p, working upon face plate q, on a diameter of about $17\frac{1}{2}$ inches, with the wheels and pulleys beforementioned, will properly wind on the thickest part of the cop, and seventy eight revolutions by p, working on three inches diameter of q, on the point of the cop, and bare spindle.

But if instead of SIX goings in to make the cop bottom 500 goings in be required, than the variations of diameters of face plate q, or consecutive increased traverses of pulley p, must be 500 instead of 6, and upon the same principle must the number of variations in the traverse of friction pulley p, be more or less as the number of goings in of the carriage may vary in the making of a cop bottom.

To effect these said traverses of pulley p, I have the shaft o, in two pieces, one has the bevel wheel n, fixed upon it at one end, and at the other end is formed a hollow tube of about fifteen inches long, in which tube is a longitudinal slot. The other piece of the shaft o, has the friction pulley p, fixed at one end, and the other end of that piece is inserted in the afore mentioned hollow tube,

so as to be permitted to slide freely in the tube. A pin fixed on that last mentioned end pertruding through the slot, will cause both pieces to revolve together, when either of them is set in motion without any hindrance to the sliding of one piece of the shaft into the other, whereby that shaft can be contracted and elongated, this will further be clearly understood by reference to the figures 1, and 3.

I further place between the carriage, and the floor, a strong guide bar *z*, in the direction of crossing the carriage, as seen in figs. 1, and 2, resting on, and supported by plates, or framing *t*, and *u*. A sliding box *v*, is by means of rollers, made to move freely backwards and forwards along the bar, the said box carries on its upper part a plate, which swivels, or moves on a short pin, which said pin is fixed in the centre of the upper part of the said box *v*, the plate has also two forks, through which pass a part of that piece of the shaft *o*, which has the friction pulley *p*, fixed on it. Two outside collars on the shaft *o*, keep that part of the shaft *o*, confined to the box *v*, so that when the bar *z*, and with it the box *v*, is moved laterally from right to left, the pulley *p*, will of course be drawn from the centre of the face plate *q*, and one piece of the shaft *o*, will slide into the other piece as before-mentioned, and the bar, box, and pulley will get to be in the situation as shewn by dots. The end of the bar *z*, (which ought to be round) I insert in a spiral cut groove of a drum *w*, fixed on the floor in front of the carriage, which said drum turns on its axle. On one end of this drum is a bevel wheel of forty-two teeth, working in another bevel wheel of twenty-one teeth, which is fixed on a shaft *x*; on the other end of that shaft, is again a bevel wheel of forty-two teeth worked by a pinion of twenty-one teeth; this last wheel is fixed on a short shaft, which has also a ratchet

wheel of ten teeth fixed on it. In the carriage I hang a catch or click, at such place, and in such a direction that as the carriage moves in the aforementioned click, acts upon one tooth of the said ratchet wheel, and causes thereby the train of wheels just described to move the drum *w*, a little, which by means of its groove moves the bar *z*, a short distance towards the left.

I have further to state that the shaft *o*, is borne at one end by a fixed bearing 8, and at the other end by a bearing on a lever 7, which said lever is at right angles with the shaft *o*, having its fulcruum fastened inside the front part of the carriage, and at the other end is supported by a catch fixed to the back part of the carriage. Whilst the carriage comes out and is spinning, and whilst the said catch so supports the lever 8, the friction pulley *p*, is prevented from touching, or working on the face plate *q*, but when the catch is removed, the gravity of the said lever, aided by an adjustable weight fastened to the falling end of the lever, causes that end, and with it the pulley *p*, to descend, and come in contact with the face plate *q*, and operate whilst the carriage goes in. The gravity with which the pulley is to fall and to act on the face plate, is to be so much as will be sufficient to prevent the pulley *p*, from slipping when in operation, and which will easily be ascertained by experience, I found an additional weight of about 3 to 4 lbs. enough, when placed on the lever. Fig. 5, shews the kind of catch I employ to support the said lever 8, and the dotted representation shews the position of the catch, when removed from under the lever, the helical spring impels it to the supporting position when the lever is lifted up.

I will now describe the action of the foregoing machinery, or mechanism which is as follows :—

"Before the commencement of making the cop, the drum *w*, is turned round till the bar *z*, is at right angles with the carriage, the lever 8, being then supported by the catch, the pulley *p*, will then be over the three inches diameter of the face plate *q*. Now at the moment when the carriage is to move in, the catch must be removed from under the lever 8, by the pulling of a string, wire, or by a lever under and across the carriage, or in any other convenient way; the friction pulley *p*, now falls and acts on the face plate *q*, by the act of the carriage going in, and the turning of the squaring band pullies as before described, and at about the end of closing in a little roller at the end of the lever 8, ascends a short inclined plane fixed on the floor for that purpose, as seen in figs. 1, and 2, and by so ascending lifts the shaft *o*, and raises pulley *p*, off the face plate, the spring now impels the catch to come under the lever 8, and support it again as before.

Now observe that in the course of this going in of the carriage just mentioned, the click moved a tooth of the ratchet wheel, and thereby, and by the shaft with the train and drum *w*, before described, brought the bar *z*, a little to the left in an oblique direction: at the moment when that took place, the sliding box *v*, caused of course the shaft *o*, to contract a little, and to bring the pulley *p*, over a larger diameter of *q*, than it was before the commencement of that going in, I say, that the bar *z*, has now by the moving of the ratchet wheel at the last going in, assumed an oblique direction, the pulley *p*, will consequently at the next going in, traverse laterally on face plate *q*, a distance equal to the angle of obliquity, because as before observed, when the carriage commences going in, or closing in, pulley *p*, will be further from the centre of the face plate *q*, than at the end of closing in, and during the going in approach the centre, as seen in the

dotted representations of these parts in fig. 1, and by so bringing in and out of operations pulley *p*, increasing the obliquity of bar *z*, also, thereby increasing the traverse of *p*, at every succeeding going in; the full obliquity of *z*, and traverse of *p*, will be accomplished at the time, when the finishing of the cop bottom is effected, as before described. The dotted representation just mentioned, is when the greatest traverse of *p*, takes place, from the largest diameter of *q*, to the diameter of three inches.

Now I have further to remark that the degrees of increase of traverse of pulley *p*, on the face plate *q*, are not equal, but most at the commencement of making the cop, and least towards its completion, the groove in the drum *w*, must therefore be formed accordingly, experience will best show the requisite progression, and which also depends much upon the kind of yarn spun, and the shape and thickness of the cop intended to be made, and should it be found difficult to obtain a perfectly correct groove, then any little inaccuracy may be compensated by the spinner turning the drum by hand one way, when he finds the yarn is winding on too slack, and the contrary way when too tight. Instead of a drum, a cam, snail, or any other contrivance for moving the bar *z*, laterally in its due proportions may be applied.

After the cop bottom is made, the catch or click is taken out of operation, by a pin or otherwise, and the traverse of the pulley *p*, may continue the same at each closing in to the completion of the cop. Yet to make a fine pointed nose (as it is called,) I find it desirable to insert the farther end of the bar *z*, namely, that end which is seen at *t*, fig. 1, in a sliding box moving in the framing by means of a screw and bevel geer. As the carriage comes out a click strikes the ratchet wheel, and causes the bevel pinion upon its axle to turn the bevel wheels and shaft,

and by the rotation of the nut to draw the screw, and its sliding box with the end of the bar *z*, towards the right hand, so that pulley *p*, gradually traverses into a smaller diameter of *q*, at every closing in, by this means the number of revolutions of the spindles increases at every end of closing in, and causes the nose of the cop to be pointed as aforesaid.

The degrees of increase of the revolutions of the spindles depends so much upon the shape of the cop, the length of the nose, and the thickness of the yarn, that no precise number or calculation can be given; but experience points out without difficulty what calculation of wheels in connection with the pitch of the threads of the screw suits best.

I have only further to observe that the surfaces of the face plate *q*, and pulley *p*, may be of such matter as produce adhesion when in operation, I have hitherto found it best to have the face plate *q*, covered over with an even coating of fine ground emery glued on, and the periphery of pulley *p*, covered with leather about 7-8 of an inch broad-coated over with adhesive matter, such as dissolved rosin, mixed with tallow, *treacle*, and oil, or other such like matter.

The winding on of yarns in this my newly invented way, causes the cops to be harder and heavier than in the usual way, and requires less labour in accomplishing, which I consider to be great advantages; and when applied to self-acting spinning machines, in which the winding on is imperfect, the advantages are still greater.

Having thus by the foregoing specification, and by the annexed drawings clearly ascertained, and described, wherein my new invention of improvements consists, and the manner in which the same is to perform. I do hereby distinctly declare, that I claim as my invention the wind-

ing on, in the manner described, accompanied by drawings, and which manner of winding on, is produced through certain mechanical motions, these said motions are produced by a combination, or system of machinery or mechanism; and I do further declare that I do not consider that the said motions to produce the effect of winding on, agreeably to my invention, are to be produced alone by precisely the same mechanism as herein before described, and the accompanying drawings, but I claim the sole right and privilege of employing that said mechanism or any other mechanism, by means of which the said mechanical motion for winding on spindles, can or may be effected."—[*Inrolled June*, 1827.]

To JOHN PALMER DE LA FONS, *of George Street, Hanover Square, in the County of Middlesex, Dentist, and* WILLIAM LITTLEWART, *of St. Mary Axe, in the City of London, Mathematical Instrument Maker, for their Invention of an Improvement in Securing or Mooring Ships, and other floating bodies, and Apparatus for performing the same.*—[Sealed 14th July, 1826.]

INSTEAD of securing ships and other vessels in harbours, rivers, and creeks, by means of anchors, or mooring blocks, as usual, the patentees propose to drive piles into the earth or sand in the bed of the harbour or river, from which piles, chains are to be carried to floating buoys, and to these the vessels are to be secured by mooring chains.

This mode of securing ships and other vessels by piles, instead of mooring blocks or anchors, constitutes the leading feature of the invention, and claim of patent right; but the manner of fixing these piles in the ground, below the water, is described in the specification, though not claimed.

A large conical rim of iron is provided, having a tube passing through it in the direction of an axis, which tube swings in jimbles, or a ball and socket at the upper part of the conical rim, in order that the tube shall preserve a perpendicular position, however uneven may be the ground upon which the base of the conical rim may rest. Into this tube, the pile is introduced, and with the conical rim is let down to the bed of the harbour or river, by means of a crane or windlass, mounted upon a platform between two stationary vessels, placed over the spot where the pile is to be driven.

The conical rim now resting upon the ground, with the pile erect, its point downwards, a chain is attached to an iron ring in the top of the pile, which chain is affixed above to a pile driving apparatus of nearly the usual construction. The rammer or weight of the pile driver is now let fall, which sliding down the chain, strikes the head of the pile, and by repeated strokes, drives it into the earth.

When the pile has been driven sufficiently far into the ground, the conical rim is drawn up, and the vessels with the apparatus removed to another station, for the purpose of driving a second pile, and so on until the required number of piles are all fixed.

The series of piles are proposed to be placed in a circle or square range, in the centre of which the floating vessel is to be moored, by means of ropes or cables extending from the vessel to the buoys and mooring chains of the several piles. In this way of mooring the vessels, the draft upon the piles will be seldom upwards, but principally in a lateral direction, which they will be able to resist, being firmly fixed in the ground.—[*Inrolled January*, 1827.]

To James Viney, *of Shanklen, in the Isle of Wight, Colonel in our Royal Artillery, and* George Pocock, *of Bristol, Gentleman, for their Invention of certain Improvements in the construction of Cars and other Carriages, and the application of a power; hitherto unused for that purpose to draw the same; which power is also applicable to the drawing of ships and other Vessels, and for raising weights, and for other purposes.*—[Sealed 18th October, 1826.]

The specification commences by stating, that this patent is for a kite to be employed as a buoyant sail to draw vessels on water, and carriages on land; also to raise weights, such as rescuing persons from shipwreck, to elevate signals, and a variety of other uses.

The first feature of this invention is the construction of a kite, which shall fold up by means of joints in the stem, when the wings will be made to collapse, and the whole fold into a small compass; second, a moveable distender placed across the kite, by which when properly placed, the wings of the kite are distended, and made to resist the pressure of wind; third, the attachment of four cords to the kite for the purpose of directing it; and fourth, connecting a series of kites one before the other, for the purpose of enabling the united force of these kites to drag, draw, or raise vessels through the water, carriages along the land, or elevate other weights as above stated.

What are the peculiarities in the construction or form of this kite, beyond that which is above stated, we know not, for the specification gives no further account of the manner of making it.

As to the construction of cars to be drawn by these kites, not a word is said in the specification, excepting that it is to be furnished with a drag underneath, we pre-

sume to prevent its proceeding too rapidly down hill, and the cord extended from the kite is to pass over a roller or pulley beneath the carriage, and to be connected to the steering apparatus.

The carriage is to be guided by means of a vertical shaft with a handle in front, having a T formed top, which being turned by a person riding in the carriage, places the axle of the fore wheels at such an inclination as will direct its course in the way described.

Nothing is said as to the form of the car, but from a sketch appended to the specification, without any reference or description, we presume, it is intended to be something like the shape of a nautilus or boat curled up at the head and stern, and running upon four wheels.

Toward the close of the specification it is observed that a platform is to be attached behind the carriage running upon wheels, for the purpose of carrying a poney. We presume this poney is intended for the double purpose of ballast in a high wind, and to assist the kite in a calm. —[*Inrolled April*, 1827.]

To DANIEL FREEMAN, *of Wakefield, in the County of York, Sadler and Harness Maker, for his Invention of Improvements in Measuring for, and in making Collars for Horses and other Cattle.*—[Sealed 14th July, 1826.]

THE patentee states, that his invention is designed to improve the shape of collars for horses, and to construct them lighter than upon the ordinary plans, still preserving sufficient firmness for their intended purpose.

In the first place, an iron framing is to be made, suited to the shape of the horse's neck, which framing is to be coated with whalebone, cane, or such other light material as may be found desirable, and being properly padded, is

to be covered with blanketing, as a soft elastic, and every way more eligible material, than any other substance which has been heretofore employed for the purpose. From the sides of the iron framing, plates or pieces of metal are to extend, and to pass round in front of the collar. To these plates it is proposed to attach sockets or rings, which are intended to supersede the necessity of hames. And, lastly, the upper part of the collar is to open by means of a hinge in the throat part, affixed to the internal framing, for the purpose of enabling it to be put round the neck of a horse or other animal, without passing over the head.

In order to take the form of a horse's shoulders and front with accuracy, an eliptical frame having many loose pegs passed through holes is to be placed round the animals neck, and the pegs being pushed forward, or withdrawn, until they all touch lightly, and with an equal pressure, the exact shape of the shoulders and front of the animal, will be obtained, which form may be transferred to a drawing, or a model made from it, and conveyed to the collar maker at a distance.

'There are no drawings accompanying this specification, to elucidate the patentee's description, but his intentions appear very evident, it is therefore only necessary to add, that these four points are claimed: 1st, The employment of a substantial framing upon which the collar is to be made, for the purpose of giving it stability; 2nd, the introduction of a joint in the throat part, by means of which the collar is enabled to open; 3rd, the attachment of sockets or rings on the side, to which the traces are to be fastened, instead of hames; and fourthly, padding and coating the inner part of the collar with blanketing.—[*Inrolled January*, 1827.]

The principle features claimed under this patent, (viz.)

the iron frame, and the method of opening this collar by a joint in the throat, as well as a mode of obtaining the form of the horse's shoulders, were previously invented and described in the specification of Musselwhite's patent granted in July, 1825, see Vol. X., page 251, of our first series. EDITOR.

To BENNET WOODCROFT, *of Manchester, in the County Palatine of Lancaster, Manufacturer, for his Invention of certain Processes and Apparatus, for Printing and Preparing for Manufacture, Yarns of Linen, Cotton, Silk, Woollen, or any other Fibrous Material.*—[Sealed 31st March, 1827.]

THIS invention is the printing of yarns of linen, cotton, silk, or wool, with a colour, a mordant, or a resisting material, previously to its being woven into cloth, or such kind of fabric. The patentee has not stated what are his particular objects in printing these materials in the form of yarns, but it is to be presumed, that it is intended to manufacture from these printed yarns, a peculiar description of fabric, of which these yarns are to constitute the warp threads.

The construction of apparatus employed in conducting this process has little or no novelty, except in some particular combinations of well known machinery, put together as matters of convenience.

In the first instance, the yarns are to be wound evenly upon a roller or beam, by passing them through a reed, which will distribute the threads equally over the surface of the roller. When several of these rollers or beams have been thus covered with yarn, they are to be placed upon an inclined frame, contiguous to a printing machine and the threads or yarns from the several beams conducted through a reed to the printing roller.

The construction of printing machine to be employed, may be the same as is commonly made use of in printing calicos, that is, having a device or subject cut upon the surface of a roller, which receives its ink or colour from a ductor in the ordinary way. Over the surface of this printing roller, the yarns are passed in connection with an endless felt, and a heavy cylinder above, pressing the felt and the yarns upon the printing roller, causes the impression to be given as the yarns pass through.

The material with which the yarns are printed, may be either a colour, or a mordant to produce and fix a colour, when the fabric is ultimately dyed, or a composition to protect or resist the dye. These matters are perfectly well understood in calico printing.

From the printing roller, the yarns proceed upwards, and are conducted by means of carrier rollers over a series of boxes heated by steam, for the purpose of drying the composition or colour printed upon the yarns. After this the yarns are divided into two sheds, and passed through reeds, and are ultimately wound upon a roller or beam, for use; or the yarns or distinct threads, may be conducted from the beam through a series of eyes fixed in a rail, and wound at any desired distances apart on to reels.

The rotatory parts of the printing machinery are turned by gear, those of the winding apparatus by friction, and this may be put in motion by steam, or by hand labour.

It must be obvious that the form and arrangement of the machinery may be varied in many ways, without effecting any considerable change in the operation; it is therefore, unnecessary to enter further into a description of the apparatus proposed to be employed, as it is acknowledged to be well known, the invention consisting simply in printing yarns in the manner above explained.—[*Inrolled September*, 1827.]

To JOHN LANE HIGGINS, *of Oxford Street, in the County of Middlesex, Esq. for his Invention of certain Improvements in the construction of Cat-Blocks and Fish-Hooks, and in the application thereof.*—[Sealed 14th July, 1826.]

THE apparatus which forms the subject of this patent is a pulley-block for taking hold of, or fishing an anchor, and for drawing it up, or catting it, in the act of weighing the anchor.

The patentee states, that the mode of catting an anchor according to the usual practice, is attended with so much labour and inconvenience, that in passing down a river, in order to save the trouble of hauling it in, the anchor is frequently left suspended from the vessel, below the surface of the water, which greatly impedes its progress.

Without describing the invention in the nautical terms which the specification sets forth, it will be sufficient to say, that the "*Fish-hook*," or hook by which the ring at top of the anchor is taken hold of, when drawing it out of the water, has an eye or hole at the back, through which a rope is passed. By this hook, which is attached to the pully or "*Cat-block*," suspended from the cat-head, the anchor is drawn up, and held until it can be made fast on board the vessel. The rope from the eye at the back of the hook, being, at the same time, passed over the end of the cat-head, and secured.

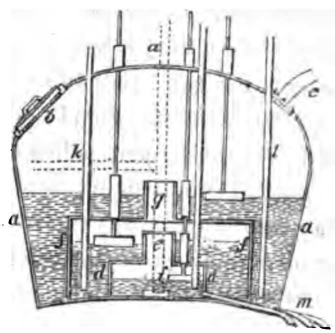
Should it be necessary to let go the anchor suddenly, the tackle of the cat-block is to be relaxed, when the rope passed through the eye of the hook becoming tight, draws the hook back, and thereby allows the anchor to slip over the point of the hook, and descend through the water to the bottom.—[*Inrolled January*, 1827.]

To JOHN POOLE, *of Sheffield, in the County of York, Shop Keeper, for his Invention of certain Improvements in the Steam Engine Boilers, or Steam Generators, applicable also to the evaporation of the fluids.*—[Sealed 4th July, 1826.]

THE object of this invention is to produce within a steam boiler, a more extended surface of water, than has been heretofore effected, in any of the previously constructed boilers applied to engines or other purposes; by which extended surface of water, it is expected that a greater quantity of steam will be evolved, than in such boilers or generators as afford an evaporation surface, commensurate to the area of one level only, of the water within the boiler.

The method of accomplishing this object, is by dividing the boiler into several compartments, one raised over the other, and causing the water to flow over a great portion of the top of each compartment, so as to produce several surfaces of water at different levels.

The plan proposed is applicable to a variety of forms of boilers, it will however be sufficiently evident by one illustration, as the same effect may be produced under divers shapes, that of a circular boiler being the most simple.



The figure here represented exhibits a section of a boiler supposed to have a circular bottom, and dome top; *a*, *a*, *a*, are the outer surfaces of the boiler; *b*, the man hole; *c*, the steam pipe. A circular rim *d*, *d*, is

attached to the bottom by rivets or otherwise, and is covered by a circular cap, leaving an opening *e*, in the centre surrounded by another rim. The lower part of the compartment formed by *d*, *d*, being occupied with water, and fire placed under it, steam will be generated, and rise through the aperture *e*, to the dome of the outer boiler.

Another rim *f*, *f*, is in like manner affixed to the bottom of the boiler, surrounding the former, at any convenient distance, and covered with a cap, leaving an opening at *g*, as in the preceding, by which steam may pass upwards to the dome. Thus the interior of the boiler is divided into three compartments, and water being introduced into each of them, and their respective surfaces brought to different levels, one above the other, as shewn in the figure, an increased area of evaporating surface is afforded by the acquisition of the two surfaces in the lower compartments.

This contrivance, it is quite obvious, may be adapted to a variety of shaped boilers, whether round, square, eliptical, or of any other form, and whether the sides are perpendicular, enclined, or of any other shape, consequently, it is unnecessary to exhibit any other shape but that in the figure.

The water is intended to be introduced to the central compartment, by the perpendicular pipe *h*, from a cistern above; and a float *i*, may be employed with a rod passing upwards through small tubes to a valve in the cistern, by which the necessary supply of water may be always regulated. A similar perpendicular pipe *k*, and float, may feed the second compartment, and another pipe *l*, and also a float may supply the third or outer compartment, and in order to draw off the water from the several compartments when that shall be required, there are pipes with cocks leading out at *m*.

Instead of the pipes and floats described, the water may be introduced by force pumps, through pipes properly disposed, passing through the sides of the compartments, but the methods of feeding are not to be considered as forming any part of this invention.

In some constructions of boilers, formed with very contracted passages and small openings, such as would prevent access to the interior, for the purpose of cleaning in the usual way, it is proposed to place a perpendicular shaft with arms, as shewn by dots in the figure, and to suspend chains from those arms, which being made to revolve, will drag the chains round the passages, and thereby remove any incrustation, or other foul matter, and allow it to flow away with the cleansing liquor through the pipes and cocks *m*, but this contrivance will only apply when the water is injected through the sides of the boiler. —[*Inrolled January*, 1827.]

To William Hobson, *of Mark-Field, Stamford-Hill, in the County of Middlesex, Gentleman, for his new Invented Improved Method of Paving Streets, Lanes, Roads, and Carriage Ways in general.*—[Sealed 15th January, 1827.]

The first and most essential matter in paving the highways of public streets and roads, where there is a very great traversing of heavy carriages, is to lay a solid and firm foundation previous to placing the paving stones. With this consideration in view, the patentee commences by spreading evenly the earth, rubbish, or any material of which the foundation of the road way is to be formed, and then ramming it hard, or rolling it, so as to produce a very sound and firm bed. He then proposes to break stones into small pieces, and spread them over the previously

rammed earth, upon which broken stones, forming a sort of M'Adamized foundation, the regularly cut paving stones are to be placed.

The intended form of the paving stones are not specified; but it is to be presumed, that they are to be cubes, which being placed close together, and properly rammed, the interstices between the stones are to be filled up with a sort of cement or grout, made of sand, lime, and water, and which, when dry, will securely bind the stones together, and form them into one entire terrace.

The same method may be adopted when the road is formed of pebbles, (viz.) first ramming the foundation very hard, and then spreading the broken stones upon which the pebbles may be placed, and cemented together by pouring upon them grout, or fluid containing such substances as will coagulate, and on drying, become a hard, adhesive substance, similar to stone.—[*Inrolled March,* 1827.]

To Robert Dickenson, *of New Park Street, Southwark, in the County of Surrey, in consequence of a communication made to him by a certain Foreigner residing abroad, for an invention for the formation coating and Covering of Vessels or Packages, for containing, preserving, conveying, and transporting goods and products, whether in liquid or solid forms, and for other useful purposes,*—[Sealed 8th December, 1826.

The subject of this patent divides itself into two parts: first, the formation of a metal barrel, cask, or other vessel of capacity, suited to the packing and conveyance of food and other perishable commodities, on ship-board, and in foreign climates; and, secondly, in a mode of, and mate-

rial for, coating the said metal barrels or casks, to prevent rust.

The patentee describes the new invented vessels to be barrels or casks, made of plate iron, in a cylindrical or a prismatic form, one end of which is secured by doubling the edges of the metal over, or by soldering them together, or by any other means that may be found convenient to render the joints air tight; the other end, which may be called the top, has the edge of the iron plate turned inwards, for the purpose of forming a ledge to support the maveable end or lid, and a hoop of metal is rivetted or otherwise fastened round the interior of the vessel, near the top, standing up, and by that means producing a recess or groove, into which a gasket or elastic pad is to be placed, in order to render that joint air-tight when the lid is put on.

The gasket or pad is to be made by a ring of tin plate, or some such material, formed to the shape of the vessel, and then wound round with flannel or other flexible substance, and coated on the outside with oil-skin, or oiled silk, which being soft and elastic, will be easily pressed into the groove, and produce a perfectly air-tight joint when the lid is put on.

The lid being a circular plate, or of any other form suited to the shape of the vessel, is placed upon the gasket or pad, and several sliding bolts or latches attached to the outside of the lid, are then to be projected into corresponding holes or slots perforated through the upper part of the rim of the vessel, and the edges of which holes or slots are to be made inclined or beveled, for the purpose of drawing the lid tight down upon the gasket, when the bolts are projected. Thus the vessel is headed or closed, and the goods within preserved from the action of the external air.

It is a very extraordinary circumstance, that the same construction of iron barrels, or casks for packing perishable goods is described, as the subject of a previous patent granted to the said Robert Dickinson, in October, 1824. (See the 10th volume of our first series, page 25.)

The vessels, when constructed of sheet iron in the way above described, are to be tinned according to the ordinary process of tinning, and they are afterwards to be covered with an alloy or mixture of metals made in the following proportions:—

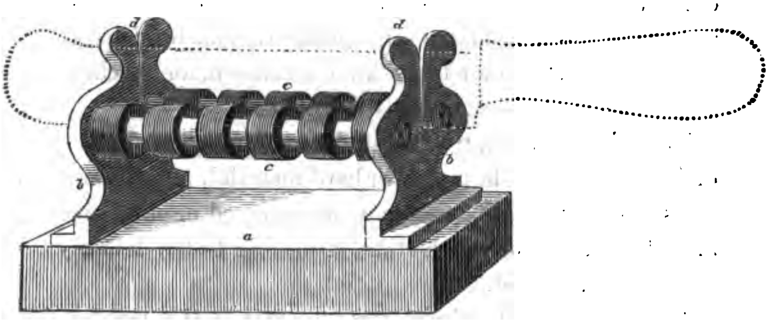
Take seventy-five pounds of tin in ingots, and having melted it in a furnace in the usual way, add to it twenty pounds of zinc; when these are properly melted together, then introduce five pounds of finely pulverized glass, and stir the whole until it is uniformly mixed together. These proportions are considered to be the most eligible, but a slight variation therefrom would be but of little consequence.

With this composition in a fluid state, the barrels or casks are to be coated in a similar way to tinning, and after that has been done, another coat of tin is put upon it, which completes the process, and protects the iron from the action of the atmosphere, and consequently precludes the possibility of its rusting.

In these vessels it is intended to pack flour, bread, biscuits, or any other kind of provision, and to keep it secure from the atmosphere. and from vermin on shipboard, and elsewhere. The same kind of vessels are likewise suited to hold a great variety of other perishable articles, and to preserve them from injury in a very superior way to any other kind of packing.—[*Inrolled June* 1827.]

To John Felton, *of Hinckley, in the County of Leicester, Machine Maker, for his Invention of a Machine for an expeditious and correct mode of giving a Fine Edge to Knives, Razors, and Scissors, and other cutting Instruments.*—[Sealed 28th June, 1827.]

This invention is a small apparatus or portable machine having two cylindrical surfaces with indentations thereon, for sharpening various cutting instruments, as knives, choppers, scissors. &c. by passing their edges backward, and forward in an angle, formed between the two cylinders, or between the intersection of two or more circular files or other suitable surfaces.



The accompanying figure represents one of these machines in perspective; *a*, is the base or block upon which the two uprights *b*, *b*, are fixed; *c*, *c*, are the two sharpening rollers formed with bosses and recesses, the bosses or elevated parts of one roller passing into the recesses of the other roller, and by that means forming an acute angle between them.

The surfaces of the bosses are engraved, or cut, or scribed round, in a circular direction, something like that sort of file called a float, and which present so many

cutting or file edges, against which the knife is pressed as it is made to pass to and fro in the machine.

The dotted lines represent the position in which the knife or other edge tool is to be placed for the purpose of being sharpened. It is passed down in the two slits of the standards marked *d*, *d*, and at the bottom of these slits the edge of the knife comes in contact with the file edges of the cylinders, where the intervention of the bosses falling into the opposite recesses, produce that acute angle which form the cutting edge of the knife, as it is drawn backwards and forwards.

The cylinders are mounted upon axles, that is, their pivots pass into the standards *b*, *b*, and are thereby enabled to turn round, when one part of the file edges has become dull; and the slits *d*, in the standards are to be made of any shape suited to fit the form of instrument intended to be sharpened, whether table knife as shewn, or a chopper, or any other description of edge tool.

The patentee says, "the cylinder may be made of steel, or any other suitable metal, or hard material, and the surfaces of the circular bosses may be engraved or otherwise brought to a fine or rough state, according to the delicacy of the edge required."

It is obvious that grindstones mounted in this manner, would answer the purpose though they would wear away much sooner than steel, but it would appear that the patentee has in contemplation to adapt circular hones or Turkey-stones for setting the edges of razors, and other delicate instruments, as he states that other materials besides steel are to be employed according to the delicacy of the edge required.—[*Inrolled August*, 1826.]

Notices of New Books.

CONNECTED WITH SCIENCE.

Some considerations on the Subject of Public Clocks, particularly Church Clocks: with Hints for their Improvement. Dedicated by Permission to the Right Honourable and Right Reverend the Lord Bishop of London. By B. L. VULLIAMY. 4to.

WE are indebted to the ingenious author of the above unpublished work, for an early perusal of its contents. Mr. Vulliamy has long been known in the scientific world for the excellence of his horological machines, and especially for the mechanical perfection of his larger clocks, which are decidedly superior to those of any other maker. Thus much is due to the well-earned fame of our author, who must now speak for himself.

"It is an observation which has often been made by those who have paid attention to the subject, that if a watch, keeping time correctly, were to be set by a public clock, take, for example, that of St. Paul's Cathedral, and the same day to be compared with a number of others of the same description, it would be found that scarcely two of them agreed together, some would be faster, others slower, and the extreme differences consequently considerable; it therefore follows that the greater number of these clocks must be wrong. I select that of St. Paul's as a standard, not on account of the accuracy with which it measures time, but from its local situation.

"The indifferent performance of public clocks in general commonly proceeds from one of the two following causes, and not unfrequently from both combined: 1st, The inherent defects in principle and execution, of the clocks

themselves; 2nd, The injudicious manner of fixing them in their places, or, as it is commonly termed, putting up, and arranging the work communicating from the clock to the hands; for, so far as my observation extends, (and I have examined a great number of large clocks) the church clocks of the present day are in no one respect better made than they were fifty years ago, but the contrary, for, in some particulars, the new clocks are inferior, especially in the quantity of material employed, which, to save expense, is often very improperly reduced, and the work crowded into too small a compass.

"As a proof of the little regard that has been paid to mathematical principles in the construction of large clocks, it will be sufficient to mention, out of a long list that might be enumerated, the two following extraordinary instances of erroneous construction: *First*, Fans offering a considerable resistance to the air, are applied to the pendulums of the great clocks at St. Paul's Cathedral, and at Purfleet Magazine. It is to be presumed, that the intention of this contrivance has been to diminish the arc of vibration of the pendulum, by opposing a medium (the atmosphere), the density of which is incessantly varying; a more unmathematical contrivance was certainly never devised nor adopted. The same was the case with the Horse-Guards clock until 1816, when I repaired it, and made the whole of the going part of the clock new. This pendulum with its fans is still to be seen in the clock-room. *Second*, that the recoil of the escapement of the clock at Bishopgate Church, (which is a very modern clock, and at different times cost the Parish a very large sum of money) is so great, as to be perceptible as far back in the train as the second wheel, thereby causing an immense and unnecessary increase of friction; and the teeth of the wheels of the going part, on which there is very little

strain, are stronger than those of the striking part, on which the strain is very considerable. Generally speaking, the practical part, or execution of the work, of these clocks, is about on a par with the theory of their construction."

From these extracts, it must be obvious that our author is right in calling the attention of practical mechanics to the construction of public clocks; and in offering "hints for their improvement," that the present is the fitting season, must be apparent from the number of new public edifices, both civil and religious, that are now erecting in the metropolis. It is, however, somewhat singular, that Mr. Vulliamy should have altogether omitted to notice the subject of illuminated or transparent dials, when the earliest experiments on the subject were actually made under his direction more than ten years back. With a few very judicious observations that he furnishes on the score of solid dials, we must close our present notice.

"The description of face I recommend is of stone, forming part of the building, as is the case with the clock dials at the Horse-Guards; and at my recommendation, the faces of the clocks at the new Church, Chelsea, and the Royal Mews, Pimlico, have been built on this plan. The four faces of the clock at Norwood new Church, have also been completed in the same manner; stone being an absorbent, and not so good a conductor of heat as metal, the paint adheres better, and lasts longer, and does not require to be renewed so often as on the copper dial. Another advantage of the stone dial is, that the centre can be sunk, and the hour hand made to traverse in the sinking: this enables the minute hand to be close to the figures and then almost all error from the effect of parallax is avoided, which in the copper dials is very considerable, especially when the minute hand points at or near 15, and

45 minutes, and the hands are both above the dial. In the stone dials of Chelsea new Church, and the Royal Mews, Pimlico, the figures are cut in the stone, and sunk about the eighth of an inch, after the manner of the Egyptian monuments, from which I derived the idea. By this method, supposing the dial accurately divided, and the figures well shaped in the first instance, they will always remain so.

"In conclusion, I feel gratified in being able to add, 1st, That in the new clock tower at Windsor Castle, that is just completed, Mr. Wyattville has, at my suggestion, made the dial of stone, with the centre sunk, for the hour hand to traverse in, and the figures sunk in the dial; and, 2nd, that the Surveyor-General gives his unqualified approbation to this construction of dial for a church or public building."

Novel Inventions.

Rosin Gas.

THE experiments that have hitherto been made with rosin, for the purpose of illuminating the London Institution, sufficiently attest the economy, as well as cleanliness of this material. We purpose, furnishing our readers with a description of the process, and a view of the apparatus, in our next number.

New Thermometer.

THE incorrectness of the thermometers hitherto employed for measuring high temperatures, having led Mr. Prinscep, Assay-master of the Mint, at Benares, to make numerous experiments on the subject. In the course of his inquiries, a remarkable fact presented itself in the

change which occurred in a spring, constructed on the compensation principle, and formed by two slips of metals, the one of silver, the other of gold, originally quite pure, and united without any alloy. In the course of a few years, although it had never been subjected to a very high temperature, the surface of the gold became converted into an alloy of silver, the impregnation extending gradually to a considerable depth in the gold, and destroying the sensibility of the instrument to changes of temperature. After trying various plans, he gave the preference to the one founded on the following principles, viz., that the fusing points of the pure metals are fixed and determinate,—that those of silver, gold, and platina, comprehend a very extensive range of temperature, and that, between these three fixed points in the scale, as many intermediate ones as may be required, may be obtained by alloying the three metals together, in different proportions. When such a series of alloys has been once prepared, the heat of any furnace may be expressed by the alloy of least fusibility which it is capable of melting. The determinations afforded by a pyrometer of this kind, will, independently of their precision, have the advantage of being identifiable at all times, and in all countries; the smallness of the apparatus is an additional recommendation, nothing more being requisite than a little vessel, containing in separate cells, the requisite number of pyrometric alloys, each of the size of a pin's head. The specimens melted in one experiment need only to be flattened under the hammer, in order to be again ready for use. For the purpose of concisely registering the results, the author employs a simple decimal method of notation, which at once expresses the nature of the alloy, and its correspondence with the scale of temperature. As the distance between the points of fusion of silver and of gold

is not considerable, Mr. P. divides this distance on the scale into 10°: obtaining measures of each by a successive addition of ten per cent. of gold, to the silver, the fusion of which, when pure, marks the point of Zero, while that of gold is reckoned at 10°. From the point of fusion of pure platina to that of pure gold, Mr. Prinsep assumes 100°, adding to the alloy, which is to measure each in succession, one per cent. of platina.

Fire Guard.

Mr. Forster, of Tottenham, has furnished us with a model of a very cheap fire-guard, which, from its portability, is well calculated for general use. It consists of a few loose rods of wire, attached together by a chain at either extremity, that may be lowered at pleasure. The great advantage of this apparatus is, that it intercepts but little heat, and yet tends effectually to prevent any person from falling into the flames.

Rain Gauge.

It does not appear to be very generally known, that this valuable instrument may be easily constructed, and rendered accessible to almost every one. It is merely to take a funnel whose opening is exactly ten square inches, and fix it in a bottle: as the rain descends, it falls into the funnel, and from thence into the collecting vessel. The quantity of rain caught is ascertained by multiplying the weight in ounces by .173, which gives the depth in inches and parts of an inch. In fixing rain-gauges, generally, care should be taken that the rain may have free access to it; hence the tops of buildings are usually the best places.

New Metallic Compound resembling Gold.

This metallic compound is invented by a gentleman at

Leghorn, a friend of T. Appleton, esq. the American consul there, who has sent an account of it, with specimens, to Dr. Mease, of New York, where it has been examined by competent judges. It is of the same weight as gold of 18 carats, and can be made like that of 24. Mr. Appleton's snuff-box is made of it, and is always mistaken for pure gold. At a manufactory of it established at Bologna, metal buttons are made of it, at 50 cents. per dozen; when new, they resemble the most highly gilt buttons. The inventor sells the metal to the manufacturers at Bologna at two dollars and sixty cents. per lb. of 12 ounces, which makes nine dozen of coat buttons. The editor of the Franklin Journal states, that this metal is soft and bends, and found its superiority to other gold-coloured metals, on its not tarnishing.

Polytechnic and Scientific Intelligence.

ASTRONOMICAL SOCIETY OF LONDON.

January 11*th*, 1828.

THERE was read a paper entited "Third Series of Observations with a 20-feet reflecting telescope;—containing a Catalogue of 384 new double and multiple stars, completing a first thousand of those objects detected in sweeps with that instrument;—together with observations of some previously known." By J. F. W. Herschel, Esq. President of the Society.

The paper, as its title imports, is a continuation of the two papers previously communicated by the author on the same subject. The field of discovery in this department of Astronomy, though narrowed by the great work re-

cently published by Professor Struve, the author considers as not yet exhausted; since, on an average of the part of the heavens swept by him, not above one in four, of double stars sufficiently remarkable to attract attention in sweeping, have been catalogued by the eminent astronomer last named; not to mention the vast number of interesting close double stars, below the 9th magnitude, which a minuter examination than the nature of his sweeps permit would no doubt produce. The double stars of this Catalogue, he observes, are considerably more *select* than those of his two former ones; those whose distance exceeds 32" being (except in particular cases) excluded, and the limit of distance being narrowed according to the faintness of the component stars.

The author prefaces his Catalogue with a comparison of the magnitudes habitually assigned to the stars by himself and Professor Struve; from which it appears that on the average, his magnitudes have a denomination about one unit lower than those of that astronomer;—a star (for example) which Mr. Struve would call of the 9th magnitude, being, in Mr. Herschel's nomenclature, of the 10th. The limit of vision in the Dorpat telescope he presumes to lie about his average 14th magnitude, though such a determination must necessarily be liable to some latitude. This conclusion he deduces from a series of instances, in which small companions have been seen by him attached to large stars, within the limits of Professor Struve's 4th class, which have escaped the notice of the latter.

The author then states the principle on which he estimates magnitudes below the 6th, which is that of continual bisection of the light; and he cites some experiments, by which it appears that the light of an average star of the 1st magnitude is at least 150 times that of the 6th. He

then adduces a series of observations of a considerable number of the closer stars, of M. Struve's Catalogue, by which it appears that the Slough telescope easily defines with its ordinary sweeping power, the generality of M. Struve's stars of the 1st. class, and many of those marked by him as *vicinæ*, and even *pervicinæ;* but those which have the epithet *vicinissimæ*, he has not yet succeeded in separating with the highest power (240) usually applied, which indeed was to be expected. In lieu of M. Struve's classification of double stars, which he considers as enlarging beyond due limits the number of those of the 1st class, he proposes the following system, which in fact very nearly approximates to that originally followed by Sir William Herschel.

Class I.	close	0" and below 1"
	not close	1 and below 2
Class II.		2 and below 4
Class III.		4 and below 8
Class IV.		8 and below 16
Class V.		16 and below 32
Class VI.		32 and below 64

So that the limit of distance of stars of the *n*th class shall be $2^n + 1$".

The author then subjonis a list of stars common to his two former Catalogues, and to that of Professor Struve, 86 in number; after which he proceeds to describe some singular phenomena observed in the course of his examination of these objects, which explain certain discrepances between the results of observations of their angles of position on different nights, and which tend to throw light on some obscure points in the theory of vision. He considers it as rendered very probable, by some of the facts adduced, that time is required for light to make an impression on the retina, as well as for the impression made

to wear off; and that this time is the less, the brighter the object; and explains by this principle a remarkable degree of unsteadiness and fluctuation observed in the limb of the planet Mars, while small stars in the field remained perfectly tranquil, as well as certain other curious phenomena.

He then adds some observations on the contrasted colours so frequently observed in double stars, and regards them as (at least) in many cases referable to the laws of vision; in virtue of which, a strong light having an access of the less refrangible rays, will cause a feebler one, in which no such excess exists, to appear of the complementary hue; instances of which, in artificial lights, are adduced. He notices especially the extremely intense red colour of a star of the 8th magnitude, R. A. 4^h 41^m. N.P.D. 61° 47' (1828.)

These prefatory remarks are terminated by some observations of the 5th star in *trapezio nebulæ Orionis*, pointed out by M. Struve. The author adduces evidence, which he considers as satisfactory, that no such star existed in that situation on the 13th March, 1826. It was observed, however, by M. Struve, to be conspicuous on the 11th Nov. of that year. It is now readily seen in the Slough telescope; and at the time of drawing up the present paper, it was so bright as not to be overlooked with the most ordinary degree of attention. He considers it therefore, if not as a NEW STAR, at least as a variable one of very singular character.

The Catalogue, which follows, is arranged in all respects like the preceding ones published in the Memoirs of this Society, and is followed by a list of about 200 double stars, for the most part found in the same sweeps with the others; but which, occurring in M. Struve's Catalogue, cannot now be regarded as new double stars.

Their observed places and estimated angles of position, distances, and magnitudes, are however given, in order to afford ground of comparison between the two Catalogues, of which comparison the results are stated.

Linnæan Society.

THE meeting which was to have been held on Tuesday, the 18th of March, was after the reading of the minutes, adjourned, in consequence of the death of the President and Founder, which took place at Norwich, on Monday, the 17th. The name of Sir James Edward Smith, as a most ardent, zealous, and successful cultivator of botany, will be handed down to posterity by the admirers of that science, as a proof of what industry and perseverance can accomplish; for we can boldly affirm, that he has by far surpassed every former or contemporary writer, in the number of his works. It is a curious fact, that the last volume of his "English Flora," a work to which he had devoted the most studious attention, was published on the Friday before his death, and a presentation copy sent to the London Institution from the author on the following Saturday.

Fossil Remains.

IT will be remembered that the Rev. Mr. Buckland distinguished himself a few years ago, by discovering a cave at Kirkdale, which he proved to be the dining room of antediluvian hyænas, that had in this retreat feasted upon elephants and water-rats, and left nothing but the teeth of these tit-bits, just as records of their good-living, and bones of contention for future naturalists and cosmogonists. The same ingenious gentleman has lately had the good fortune to find a piece of red sand stone, bearing on it the traces of an antediluvian tortoise's foot-steps. The whole geological world has been in raptures at this discovery; and in order to make sure of the fact, that the

steps traced in the stone were the steps of a tortoise, a meeting of the Society was held, and some soft chalk was prepared, on which a modern tortoise might make his mark, and thus authenticate as it were, the signature of his ancestor. Every thing being ready for the demonstration, and the interest of the scientific company wound up to the highest pitch, the tortoise was placed on the chalk, and, first of all, he flatly refused to stir a step. The members, upon this, very properly waxed impatient, got in a rage, and began kicking and banging him about, and maledicting him in an extremely moving manner. They had much better, however, have refrained from these stimulants, for when the tortoise was at last prevailed on to walk, he insisted on walking as straight as an arrow; whereas the antediluvian tortoise's march was as crooked as a ram's horn. The Society were aghast at the discrepancy. Various arguments however, were used to console them. It was suggested, that the tortoise might have forgotten the true manner of walking while confined in the ark; and that owing to this circumstance, the proper step might have been lost by its descendants. Or it might be, that chastened by the deluge, his slow race had returned to the path of rectitude, which they had, in the universal degeneracy, wilfully deserted for devious ways. Or, perhaps they had one way of walking on red sand stone, and another on soft chalk: one manner in private, and another before scientific beholders*.

Water Companies.

We are glad to be enabled to inform our metropolitan

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* The learned Society here alluded to, will we are persuaded excluse the harmless raillery of our anonymous correspondent. Subjects that have formed the pursuit of a Cuvier and a Buckland, can never be of themselves ridiculous, it is only when they fall into the hands of dilletanti philosophers, that they can be stigmatized as puerile.

readers, that there is now every chance of an immediate report being made by the commissioners who were appointed to furnish data on the comparative purity of the waters employed for domestic purposes. We must, however, enter our protest against the paltry and niggard spirit with which the funds have been doled out for this very important investigation.

Rain in Bombay.

A register of the rain gauge in Bombay, gives the following results, respecting the fall of rain in the months of June and July, for the last eleven years:

Years.	*June. Inches.*	*July. Inches*	*Total Inches.*
1817	45.72	23.67	69.39
1818	22.54	17.69	40.23
1819	15.95	30.66	46.61
1820	18.82	28.37	47.19
1821	15.18	20.66	35.84
1822	29.21	26.59	55.80
1823	21.76	15.96	37.72
1824	3.89	8.7	11.96
1825	24.45	25.17	49.62
1825	17.75	26.97	44.72
1827	49.15	10.29	59.44

Aërolites.

Mr. Prinsep, of Benares, has communicated to the Asiatic Society of Calcutta, an account of an aërolite that fell in the district of Azim Gerh, on the 27th of February last. It occurred at about three P. M., nearly five miles from a village called Mhow. The phenomenon was, as usual, attended with loud noises in the air, resembling the roaring of cannon; but as the sky was perfectly clear and serene, there could be no reason for confounding this

natural effect of the rapid motion of the stone through the atmosphere with the accompaniment of thunder and lightning, as is commonly done in accounts of such occurrences. Mr. P. remarks, that when clouds are present, it is difficult for inexperienced observers not to attribute the noise and the light to a cause with which they are familiar and hence may have originated the vulgar notion, prevalent among the natives of this country, as in Europe, that aërolites are palpable thunder-bolts. There is certainly sufficient resemblance between the luminous globular appearance which is frequently observed in heavy storms, attached to prominent places, and the ignited ball of the meteoric mass; but, in the former case the fiery ball is perfectly unsubstantial, and is merely caused by the passage of accumulated electric fluid through some conductor; whereas the ignition of the aërolite is produced simply by the condensation of the air, upon which it impinges with immense velocity. Indeed this circumstance is perhaps the strongest argument in favour of its extramundane origin; for examination generally shews, that the action of heat has been confined to the surface, and has there been so intense, as to fuse superficially the refractory metals of which it is composed, while the interior remains unaffected. Now if, as some have imagined, the stone were formed by sudden condensation of vapours in the atmosphere itself, the heat must have acted equally throughout the whole mass; and as to the idea of projection from the earth's surface, we know of no mechanical projectile force capable of heating the body thrown, even in a moderate degree, for the resistance of the air almost immediately annihilates any initial velocity beyond a certain extent, and derived from a momentary impulse; whereas the effect of gravity and distance of fall combined, will allow us any velocity we require for the aërolite, and

will explain why some should be more perfectly fused than others when they reach the earth. The sudden heating is also most likely the reason of the stones generally bursting to pieces with explosion in the air; and the noise, Mr. P. concludes to be produced by the rushing of the air into vacuo left in the rapid track of the meteor, as is the case with the electric shock, musquetry, *&c.*; and it may be added, that as no projectile, (no incombustible projectile, to speak in correct terms,) has the power of producing a report during its flight, it is quite impossible that an aërolite should be of terrestrial origin.

On the present occasion, four or five fragments were picked up three or four miles asunder, enough of itself to prove its extraordinary velocity. One small piece fell on a tree, and broke it; another wounded a man severely in the arm; the largest piece, which was sent by the Thanadar of Buhadoorgunj to the magistrate, weighed three pounds. The substance of the aërolite is so precisely similar to the stones which fell near Allahabed, in 1802, and near Moradabad, in 1808, and indeed, all others of meteoric origin, that Mr. P. has thought it needless to describe it minutely. The surface is black and slaggy, the interior grey, friable, and sparkling, with particles of metallic nickel and iron. The specific gravity was found to be 3.5. The stone required the aid of oxygen gas to fuse it; and when crumbled, the magnet separated about one-eighth of metallic grains, which left the earthy matrix more fusible; the presence of chrome and nickel were recognized by their respective tests.

Ficus Indica.

On the banks of the Nerbudda, in the province of Guzerat, is a banian tree, supposed by some persons to be

the one described by Nearchus, and certainly not inferior to it. It is distinguished by the name of Cubbeer Burr which was given to it in honour of a famous saint. High floods have, at various times, swept away a considerable part of this extraordinary tree; but what still remains is nearly 2,000 feet in circumference, measured round the principal stems, the over-hanging branches not yet struck down, cover a much larger space, and under it grow a number of custard-apple, and other fruit trees. The large trunks of this single tree amount to 350, and the smaller ones exceed 3,000, each of these is constantly sending forth branches and hanging roots, to form other trunks, and become the parents of a future progeny. The Cubbeer Burr is famed throughout Hindoostan, not only on account of its great extent, but also of its surpassing duty. The Indian armies generally encamp around it, and at stated seasons, solemn jatarras, or Hindoo festivals, to which thousands of votaries repair from every part of the Mogul Empire, are there separated. It is said that 7,000 persons find ample room to repose under its shade. It has long been the custom of the British residents in India, on the hunting and shooting parties, to form extensive encampments, and spend weeks together under this magnificent pavillion, which affords a shelter to all travellers, particularly to all the religious tribes of the Hindoos. It is generally filled with a variety of birds, snakes, and monkeys, the latter of which both divert the spectators by their antic tricks, and interest him by the parental affection they display to their young offspring, in teaching them to select their food, to exert themselves in jumping from bough to bough, and in taking, as they acquire strength, still more extensive leaps from tree to tree. In these efforts they encourage them by caresses, when timorous and menace, and even beat them when refractory.

The Plague.

At a late sitting of l'Acadamie des Sciences de l'Institut, M. Moreau de Jones communicated the following fact, which was sent to him in an official correspondence. A boat of the Ionian Isles having been met at sea by a Turkish vessel, was forced to send her captain on board the latter. On her return to Cephalonia, this boat was put under quarantine, and it was discovered that the captain, who had communicated with the Ottoman boat, was already seized with the first symptoms of the plague. Although no one else offered any sign of this contagion, the English physician of the Lazaretto, considered that all the crew, to the number of twelve, having remained together, might have received the germ of this frightful disorder.

New Patents Sealed in 1828.

To Caleb Hitch, the younger, of Ware, in the county of Hertford, brick-maker, for his having invented or found out an improved wall for building purposes.—Sealed 21st February—2 months for inrollment.

To George Dickinson, of Buckland-mill, near Dover, in the county of Kent, paper-manufacturer, for his invention of an improvement or improvements in making paper by machinery.—21st February—4 months.

To Angelo Benedetto Ventura, of Cirencester-place, Fitzroy-square, in the county of Middlesex, professor of music, for his having invented certain improvements on the harp, lute, and Spanish guitar.—21st February—6 months.

To Thomas Otway, of the parish of Walsall, in the county of Stafford, iron master, for his new invented expedient for stopping horses, when running away with riders or in carriages—21st February—2 months.

To David Bently, of Pendleton, in the county of Lancaster, bleacher, for his having invented or found out an improved method of bleaching and finishing linen or cotton yarn and goods.—21st February—6 months.

To William Brunton, of Leadenhall-street, in the city of London, civil engineer, for his having invented certain improvements on furnaces for the calcination, sublimation or evaporation of ores, metals, and other substances.—21st February—2 months.

To John Levers, of the town of Nottingham, machine-maker, for having invented or found out certain improvements in machinery for the manufacture of bobbin-net lace.—3rd March—4 months.

To William Poronall, of Manchester, in the county of Lancaster, weaver, for his new invented improvements in making healds for weaving purposes.—6th March—4 months.

To Barnard Henry Brook, of Huddersfield, in the county of York, Civil engineer, for his new invented improvements in the construction and setting of ovens and retorts for carbonizing coal for the use of gas-works.—6th March—6 months.

To William Roger, of Norfolk-street, Strand, in the county of Middlesex, lieutenant in our royal navy, for his invention of certain improvements on anchors.—13th March—6 months.

To Robert Griffith Jones, of Brewer-street, Golden-square, in the county of Middlesex, in consequence of a communication made to him by a certain foreigner resid-

ing abroad, for an invention of a method of cementing China, and certain other compositions which he denominates Letnophanic, translucid, or opaque China.—13th March—2 months.

To George Scholefield, of the parish of Leeds, in the county of York, mechanic, for his invention of certain improvements in, or additions to looms for the purpose of weaving woollen, linen, cotton, silk, and other cloths.—13th March—6 months.

To Nathan Gough, of Salford, in the county of Lancaster, civil engineer, for his having invented or found out an improved method of propelling carriages or vessels by steam or other power.—20th March—6 months.

To Samuel Cligg, of Chapel-walks, Liverpool, civil engineer, for his invention of certain improvements in the construction of steam engines, and steam boilers, and generators.—20th March—6 months.

Notice to Correspondents.

A pamphlet has been forwarded to the London Institution by the Secretary of the "Society for superseding the necessity of employing Climbing Boys," and as the tract really relates to practical science, an early notice will be taken of its contents.

We have to thank Mr. Forster for the loan of his simple Hygrometric Instrument, of which an engraving will appear in our next number.

Dr. Birkbeck's promised communication on the Vacuum Crane, will be illustrated by engravings, and fully demonstrate its practical utility.

An outline of the proceedings at the London Institution *Conversazione*, in our next.

Meteorological Journal kept at the London Institution.

DATE.	TIME.	BAROM.	Thermometer. IN.	Thermometer. OUT.	WIND.	REMARKS.
JAN. 1	9	29·60	55	47·8	S.	Rain
	3	29·70	56	48·2	S. E.	Rain
2	9	30·00	55	46·4	S.	Foggy
	3	29·90	56	47·8	W.	Rain
3	9	29·50	56	43·8	W.	Fine
	3	29·55	58	47·2	S. W.	Rain
4	9	29·90	53	43·6	S. W.	Rain
	3	29·80	54	45·4	S. W.	Rain
5	9	22·70	53	42·8	S. by W.	Rain, Snow, &c.
	3	29·80	55	44·2	S. by W.	Rain
7	9	30·10	46	38·2	W.	Cloudy
	3	30·05	47	39·4	W.	Ditto
8	9	30·00	45	35·8	S. E.	Ditto
	3	30·05	46	38·4	S. by E.	Ditto
9	9	30·10	44	34·4	N. E.	Ditto
	3	30·05	45	36·2	N. E.	Fine
10	9	29·85	47	32·2	N. by W.	Ditto
	3	29·80	48	34·8	S. W.	Ditto
11	9	29·65	46	34·2	S. W.	Snow
	3	29·65	47	36 8	S. by W.	Rain
12	9	29·85	50	42·0	S. W.	Foggy
	3	21·85	51	43·4	S. W.	Ditto
14	9	29·65	49	39·8	S. W.	Ditto
	3	29·65	50	41·2	S. by W.	Cloudy
15	9	29·85	50	38·4	N. by W.	Ditto
	3	29·85	50	36·2	N. W.	Cloudy, snow in even.
16	9	29·85	49	37·8	N. W.	Rain
	3	29·90	50	40·2	N. by W.	Rain
17	9	30·05	51	42·2	N. E.	Ditto
	3	30·05	53	45·4	N. E.	Ditto
18	9	30·15	53	52·5	S. W.	Ditto
	3	30·15	55	54·8	S. W.	Cloudy
19	9	30·35	54	52·2	S. by W.	Fine
	3	30·35	55	53·6	S. W.	Ditto
21	9	30·35	52	52·2	S W.	Ditto
	3	30·35	55	54·8	S. W.	Ditto
22	9	30·20	51	50·2	W.—S. W.	Cloudy
	3	30·25	53	54·2	S. W.	Fine
23	9	30·35	54	49·2	W.	Ditto
	3	33·35	56	52·4	S. W.	Ditto
24	9	30·45	55	48·2	S. W.	Cloudy
	3	30·40	56	49·4	S. W.	Rain
25	9	30·30	55	47·2	S. by W.	Ditto
	3	30·30	56	49·4	S. by W.	Ditto
26	9	30·30	54	45·4	S. W.	Fine
	3	30·35	56	48·8	S. W.	Ditto
28	9	30·50	51	44·8	S. W.	Foggy
	3	30·50	53	47·6	S. by W.	Cloudy.
29	9	30·30	54	46·4	W.	Rain
	3	30·35	55	48·2	W.	Fine
30	9	30·20	54	45·2	S. W.	Ditto
	3	30·15	56	48·4	S. W.	Ditto
31	9	30·10	55	46·4	S. W.	Fine
	3	30·05	56	47·2	S. by E.	Rain

Meteorological Journal kept at the London Institution.

DATE.	TIME.	BAROM.	Thermometer. IN.	OUT.	WIND.	REMARKS.
FEB. 1	9	30·05	54	47·6	S. W.	Rain
	3	30·05	?5	49·2	S. W.	Fine
2	9	30·20	55	46·2	S. W.	Ditto
	3	30·20	57	48·4	S. by W.	Ditto
4	9	30·30	55	45·4	S.	Cloudy
	3	30·30	56	46·8	S.	Ditto
5	9	30·30	55	44·8	S. W.	Ditto
	3	30·30	56	48·2	S. W.	Ditto
6	9	30·20	56	47·8	S. by W.	Ditto
	3	30·15	57	50·4	S. W.	Ditto
7	9	30·05	56	48·2	S. W.	Foggy
	3	30·00	58	49·8	S. W.	Rain
8	9	29·95	55	43·6	N	Fine
	3	29·90	56	45·4	N.	Cloudy
9	9	29·75	53	41·2	N. by E.	Ditto
	3	29·75	53	41·4	N. by E.	Rain
11	9	29·75	46	36·4	N. by E.	Snow
	3	30·05	46	36·8	N. by E.	Ditto
12	9	30·10	45	31·2	N. by W.	Ditto
	3	30·20	46	33·8	N.	Ditto
13	9	30·20	47	33·2	N. by E.	Cloudy
	3	30·10	48	35·6	N.	Ditto
14	9	29·80	46	35·4	S. E.	Ditto
	3	29·55	47	35·8	S. E.	Snow
15	9	29.80	49	36·4	W	Fine
	3	29·85	50	39·2	N. W.	Ditto
16	9	29·95	48	35·4	W.	Ditto
	3	29·90	49	36·8	W	Ditto
18	9	29·50	50	36·8	N. W.	Fine
	3	29·45	50	39·2	N. by W.	Rain
19	9	22·40	51	41·2	W.	Fine
	3	29,40	52	43·4	W.	Ditto
20	9	29·30	63	42·4	S. W.	Ditto
	3	29·20	53	44·8	S.	Ditto
21	9	29·10	54	42·2	N. E.	Ditto
	3	29.05	55	43·8	N. E.	Rain
22	9	29·10	55	43·2	S. by E.	Ditto
	3	29·10	56	45·6	S. E.	Cloudy
23	9	29·40	54	44·8	S. W.	Rain
	3	29·45	56	47·2	S. W.	Cloudy
25	9	29 95	56	50·8	S. by W.	Rain
	3	29·95	58	51·2	S. W.	Ditto
26	9	30·10	56	51·6	W. S. W.	Cloudy
	3	30·10	59	53·8	S. W.	Ditto
27	9	30·20	57	51·2	S. W.	Ditto
	3	30·20	59	52·8	W. S. W.	Ditto
28	9	30·40	58	49·8	N. E.	Ditto
	3	30·40	59	51·8	N. E.	Fine
29	9	30·30	57	48·2	W. S W.	Cloudy
	3	30·30	58	50·4	N.	Ditto

D.	H.	M.	S.	
1	0	0	0	Clock before the ⊙ 3' 54"
1	18	0	0	☾ in conj. with λ in Vergo.
2	8	0	0	☾ in conj. with 2 α in Libra.
2	8	0	0	☾ in conj. with ♃ long 12° in Libra, ☾ lat. 1° 31' N. ♃'s lat. 1° 23' N. diff. lat. 8
3	2	0	0	☾ in conj. with 4 ζ in Libra.
3	10	0	0	☾ in conj. with ♄ in Libra.
4	15	45	58	♃'s first satt. will immerge.
5	0	0	0	Clock before the ⊙ 2' 42"
5	20	0	0	♃ in conj. with 2 α in libra.
6	10	14	28	♃'s first satt. will immerge.
7	0	6	0	☾ in □ last quarter.
8	0	0	0	☾ in conj. with β in Capri.
8	23	0	0	♀ in conj. A in Taurus.
10	0	0	0	Clock before ⊙ 1' 17"
13	5	0	0	☾ in conj. with ε Pisces.
13	12	8	23	Jup's first satt. will immerge.
13	21	18	0	Ecliptic conjunction, or ● New Moon.
15	0	0	0	⊙ before the clock 1'.
16	23	0	0	☽ in conj. with 1 δ in Taurus.
17	0	0	0	☽ in conj. with 2 δ in Taurus.
17	2	0	0	☽ in conj. with ε in Taurus.
19	15	14	0	⊙ enters Taurus.
20	0	0	0	⊙ before the Clock 1' 11"
20	14	2	25	Jup's first satt. will immerge.
21	17	18	0	☽ in □ first quarter.
22	11	0	0	☽ in conj. with 1 α in Cancer.
22	12	0	0	☽ in conj. with 2 α in Cancer.
23	10	0	0	☽ in conj. with • in Leo.
23	20	0	9	☽ in conj. with π in Leo.
25	0	0	0	⊙ before the Clock 2' 10"
25	21	0	0	☽ in conj. with σ in Leo.
27	15	56	31	Jup's first satt. will immerge.
29	2	0	0	☽ in conj. with λ in Virgo.
29	10	44	0	Ecliptic opposition, or Full Moon.
29	21	0	0	☾ in conj. with Jup. long. 10° in Libra. ☾ lat. 1° 18' N. Jud's lat. 1° 24' N. diff. lat. 6'
29	16	0	0	☾ in conj. with 2 α in Libra.
30	0	0	0	⊙ before the Clock 2' 57"
30	9	0	0	☾ in conj. with 4 ♄ in Libra.
30	18	0	0	☾ in conj. with δ in Libra.
30	20	0	0	Mars in conj. with 1 γ in Sag.

☾ The Waxing Moon.— ☾ The Waning Moon.

Rotherhithe J. LEWTHWAITE.

METEOROLOGICAL JOURNAL, FOR FEBRUARY, AND MARCH, 1828.

1828.	Thermo.		Barometer.		Rain in inches.	1828.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low.	High.	Low.			Hig.	Low.	High.	Low	
FEB.						MAR.					
26	55	46	29,95	29,92	,05	12	54	38	30,00	29,96	
27	54	45	30,14	30,00		13	62	36	30,11	30,04	
28	51	43	30,25	30,22		14	63	41	30,22	30,16	
29	54	38	30,28	30,13		15	63	34	30,28	30,25	
MAR.						16	62	37	30,30	30,16	
1	53	39	30,21	30,04		17	59	47	30,10	stat	
2	48	40	30,02	29.99	,06	18	55	41	30,10	29,82	
3	48	33	29,96	29.82		19	53	42	29,51	29,42	,125
4	51	36	29,86	29,72		20	53	34	29,45	29,14	
5	54	34	29,71	29,61		21	51	40	29,06	29,04	,025
6	40	27	30,02	29,82		22	45	34	29,23	29,23	,02
7	42	25	30,17	30 06		23	49	29	29,46	29,36	,05
8	58	40	30,14	29,96		24	49	27	29,72	29,56	
9	54	45	30,15	stat.	,025	25	45	31	29,83	29,73	,05
10	56	45	30,16	30,14							
11	55	39	30,16	30,14							

LOWER EDMONTON. CHARLES H. ADAMS

Lat. 51° 37' 59" N. Long. 3' 51" W. of Greenwich.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. II,

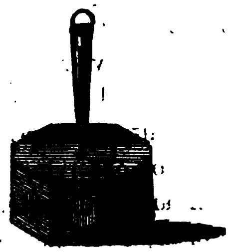
[SECOND SERIES.]

Original Communications.

Art. VI.—Description of an Anemoscope for ascertaining the course of the Air, when there is not any perceptible wind blowing.

Communicated in a letter to the Editors of the London Journal of Arts and Sciences.

Gentlemen.—Several years ago I contrived an instrument for shewing by evaporation the direction of the currents of air in calm weather, when there was not any perceptible wind. The following is a description of its arrangement and the method of using it.



The above instrument consists of an octangular tin box, with a circular opening in each of the sides; within the box, pieces of blotting paper are fastened, which cover the openings. On the top or lid of the box, is a tin tube or socket, in which is a cork with a ring. The ring is to

suspend the apparatus from a tree in the air. If desirable, the box may be reversed and elevated on a pole, the upper end of which is to fit into the tin tube. The method of using this instrument, is to equally wet all the portions of blotting paper which appear through the holes, and then elevate it, and after it has been exposed a short time to the air, it is to be noticed, which portion of blotting paper has dried most. I think thin slabs of slate, or of stone, which easily give out moisture, would be far preferable to using blotting paper. This instrument is founded on the principle by which, I have understood, sailors ascertain the course of the air in a calm, which is, by wetting a finger, and holding it up in the air, then by feeling which part becomes (by evaporation) cool, they judge from whence the current of air flows. It is obvious that when the sun shines, erroneous conclusions may be made without due attention.

B. M. FORSTER.

Walthamstow, Essex,
7th April, 1828.

ART. VII.—NEW MODE OF VIEWING THE SPOTS ON THE SUN'S DISC. BY KNIGHT SPENCER, ESQ.

To the Editors of the London Journal of Science, &c.

GENTLEMEN.—The enquiry into the physical properties of the sun, and the nature of the spots so frequently seen on his disc, seems for some time to have remained stationary, yet the inquisitive mind is still desirous to know something more, and, to me it is matter of surprise, that the following simple and easy mode of observing this luminary, has not been published, in any of the scientific journals, as I believe, nor in any of the Cyclopædias, which I have examined; it has, however, afforded myself and friends

—if not useful knowledge—at least I trust, unblameable amusement, and improved, as I hope it may be in scientific hands, it may become the means of affording more strongly grounded conjectures on the subject, than those now before the public,—that of the truly great Herschel, not being entirely free from objections. By this apparatus, without the least straining of the eye, the image of the sun's disc may be leisurely examined, on which I have frequently seen,—not only the spots, but also what appear to be hills and vallies all over its surface, and also long ridges of shining matter much brighter than the general face of the sun. By this apparatus, the size of the spots may be measured with ease, I do not say with mathematical accuracy, but in round numbers—the method of doing this is the following:—

I reduce the sun's image on the screen (see diagram Plate 3, fig. 1,) to 24 inches diameter, with a pair of compasses, I take the length of the spot or spots, suppose they measure 7-10ths of an inch, then, as 24 inches are to 880,000 miles the diameter of the disk, (in round numbers) so are 7-10ths of an inch to 25,600 miles, the space occupied by the spot or spots.

The apparatus consists of a Dollond's two-feet six inches, achromatic telescope, with a magnifying power of about 40, having rack work to give a vertical and horizontal motion; this is fixed to, and projects through a door into a darkened room, having a south aspect, and is set to the latitude of the place.

a, is the door; *b*, the telescope; in the centre of the door is an aperture about 12 inches square, round which is nailed a piece of black cotton cloth *c*, this is tied round the telescope outside the door to prevent the light from entering the room, and affords space for the telescope to work freely; *d*, is a screen of very fine grained white paper

about 30 inches square, supported on a stand, having rack work to elevate or depress it, and also to place it perpendicular to the telescope, so that, when the image of the sun is thrown upon it through the telescope, it may be perfectly circular.

Perhaps a concise statement of some of the most prominent opinions on the subject, may not be unacceptable to your readers. Gallileo was the first person who discovered the spots on the sun in 1610, he seemed to think them matters floating on the surface. Doctor Derham supposed them volcanos.

Doctor Franklin supposed them to consist of portions of sulphur thrown up into the sun's atmosphere by the action of fire, and when removed from its influence, it congregated into masses too heavy to float longer, and sinking to the body of the sun, again became subject to the action of fire.

Doctor Wilson of Glasgow was of opinion that the dark part of the spots are cavities in the sun's atmosphere, and that the less dark appearances which surround the dark part are the shelving or sloping sides of the cavity.

M. de la Lande, in 1776, was of opinion that the darkest part of the spots, are bodies of rocks projecting above the general luminous surface, which rocks are laid bare by the flux and re-flux of the luminous matter which surrounds the sun, and that the lighter parts of the spots, are only parts of the same body of rocks partially covered with the luminous matter.

Doctor Herschel's opinion is, that the sun is a habitable globe, surrounded with *two* atmospheres, the outermost consisting of bright empyreal luminous, or phosphoric clouds, the innermost, of clouds much less luminous, that the dark parts of the spots, which he calls *openings*, are portions of the solid body of the sun laid bare, the lighter

parts he calls shallows, to account for these openings. Doctor Herschel presumed that there exists a transparent elastic gas, which forces its way through the lower atmosphere, mixes with the gases in the higher regions, and thus promotes the increase, and assists in maintaining the general luminous phenomena. Shallows he thinks are level depressions of the luminous clouds, which surround the openings.

It appears, therefore, that Doctor Herschel and Doctor Wilson do not differ materially as to the spots; the latter Gentleman has given in the Philosophical Transactions, the method of measuring the shelving or sloping sides of spots, one of which he measured in November 1769, and found it four thousand miles in depth; it is therefore presumable upon his hypothesis, that the luminous matter surrounding the sun is in depth 4,000 miles.

Persons who like myself have dabbled in these matters, cannot but have formed some opinion on the subject—should such opinion however differ from the high authority of Doctor Herschel, would it not be chastiseable presumption to publish it.

Should this paper be the means of drawing the attention of your scientific friends to this subject, my object will be fully accomplished.

I am, Gentlemen,

Your obedient Servant,

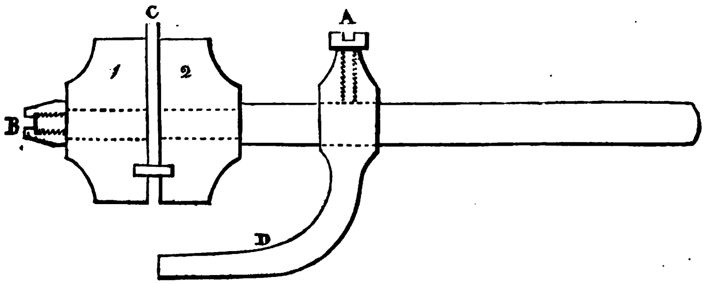
KNIGHT SPENCER.

West Brixton,
April 7th, 1828.

Art. VIII.—Description of a New Saw-set, invented by Mr. Fryer.

Gentlemen,—Should the following description of a saw-set invented by me about fourteen years since, and

which I have found by experience fully to answer the purpose for which it was intended, be thought worth a place in your valuable publication, it is quite at your service.



It is used in the same way as the common saw-set, the handle runs through the two cheeks 1 and 2, as shewn by the dotted lines. The cheeks and stops are made to take off at pleasure; it is regulated and fixed to suit the setting of any saw more or less by loosening the screw A, and the nut B, and moving the stop C, higher or lower, and the stop D, nearer or farther from the saw against which it acts. There should be two or more stops to suit the thickness of sash and hand saws. The edges of the cheeks vary to suit the different saws, and the stops may be reversed.

I think it must appear evident, that a saw-set thus constructed, acting upon principles that cannot err, and by which, even an inexperienced person may set a saw better than is usually, or perhaps can be done by any saw-maker, must be of considerable importance, at least to every working mechanic, and interesting to most of your readers.

Yours, &c.

R. FRYER.

18, *Pitfield Street, Hoxton.*

Art. IX.—Improved Mode of Cleansing Flues. Communicated by Samuel Woods, Esq. Junr.

To the Editors of the London Journal of Arts and Sciences.

Gentlemen.—With peculiar satisfaction, I embrace the opportunity of calling the attention of the public, through the medium of your valuable pages, to the evils of a practice, most disgraceful to an enlightened nation, the employment of *little children*, often at the tender age of five or six years, in sweeping chimneys; and to the means by which it may be totally and effectually abolished.

Any person who takes the trouble to examine the condition of the poor chimney sweeps, will find that the initiation into the business of climbing chimneys, is a period of the greatest suffering. Exposed every morning at very early hours to all the inclemencies of the weather, with bare legs and feet, and only two or three slight garments to protect them, they are compelled to go from house to house, and ascend steep and rugged flues by supporting their weight on the back, knees and elbows, which from constant climbing, and from the acrid quality of the soot continually worked in, soon ulcerate and become deep wounds. Inflamed eyes, frequent liability to accidents from falls, and a fatal disease peculiar to themselves, called the chimney sweeps cancer, are also evils to which they are always subject. The filth, from which they are seldom cleansed, is most injurious to their health, the absence of opportunity for education, and the degraded light in which they are regarded, are most destructive to morality. Those who survive this multiplicity of evils (often crippled and maimed) when too big to continue in the occupation, are thrown upon the wide world, unfitted for any other employment, and only associated with by

the very lowest grade of society. The consequence, as may naturally be anticipated, is, that they become the most abandoned characters, practising every species of depravity and vice. Without taking into consideration the hardships of their childhood, this alone is a sufficient reason for the abolition of the practice.

It has been frequently urged by those, who will not examine the question practically, that they see the little chimney sweeps on the first of May, looking as happy as possible, they have asked several if they were not happy, and the answer was in the affirmative. Are such persons aware of the fact, that if it ever comes to the knowledge of their masters, they have said they dislike the occupation, these poor little fellows are severely beaten and ill-used. To me the first of May brings feelings of a different cast. I lament to see little children, naturally the most lovely of beings, begrimed with mingled soot and tawdry paint, and joining in the rude dance, to the unmusical clattering of the brush and scraper, altogether looking more like the offspring of a barbarous and untutored nation, than that of *British* subjects.

To prove that chimneys may be more effectually cleansed by machinery than boys, I will now, proceed to describe the annexed engravings.

The machine is an improvement by Joseph Glass on the excellent invention of Mr. Smart. The brush (fig. 1,) is made of a round stock *a*, commonly alder, and pierced with small holes; into which bunches, formed of strips of the best whale-bone, are inserted, and made fast by glue. These strips *b*, are 8 to 8½ inches in length, which makes the brush, including the stock, about 20 inches in diameter; it therefore completely fills, and consequently effectually cleanses, the largest flues, which are never more than 14 inches square, and seldom more than

Fig. 1.

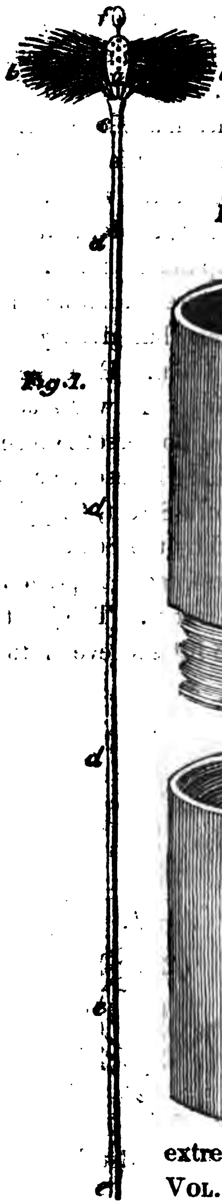
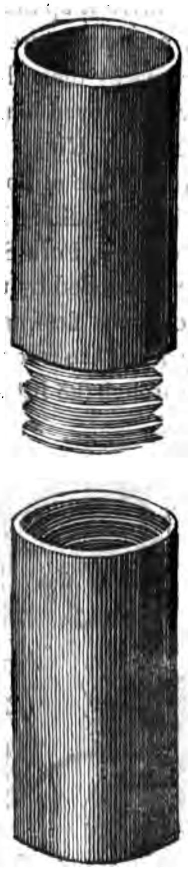


Fig. 2.



14 inches by 9. To make it pass more readily up the chimney, a small wheel *f*, is fixed to the top of the stock *a*. At the end of the stock *c*, is a very strong brass ferrule, with a wormed socket, which receives the screw of the first joint *d*.

Fig. 2, is a representation, in their actual size, of the ferrules. The three first portions *d*, *d*, *d*, 2½ feet in length, are made of good cane; the rest *e*, *e*, *e*, &c. of ground ash, and of the same length; the number used depending, of course, upon the height of the chimney; these gradually become stronger towards the bottom, and are affixed to each other, as the brush is forced higher up the chimney, by means of the brass screws and sockets, Fig. 2, before described.

The superiority of this machine consists in its extreme pliability, lightness, strength,

and aptitude to turn by a little force applied at the bottom. It has been effectually used in crooked chimneys, were Smart's machine has not been able to pass. A machine has been made at Bath, somewhat on the same principle; the joints or portions, made of several slight canes twisted together, are, however fastened by a small iron screw, which has been found too weak: the whole machine is clumsy, and is so very pliable, that the force exerted below cannot drive it up the chimney. J. Glass, who is a bricklayer, a manufacturer of his machines, and a cleanser of chimneys by them, has given great satisfaction to those who have employed him. He sweeps the chimneys of the Excise, the King's New Palace, Lloyd's Coffee-House, part of those of Somerset House, and of several Insurance Offices, Banking Houses, &c. He resides at No. 2, Moor Lane, Fore Street, Cripplegate; and is particularly recommended by the Society.

Fig. 3, is a cloth to fix over the fire-place, to prevent the falling soot from flying about the room. The joints of the machine are worked through the little sleeve in the middle.

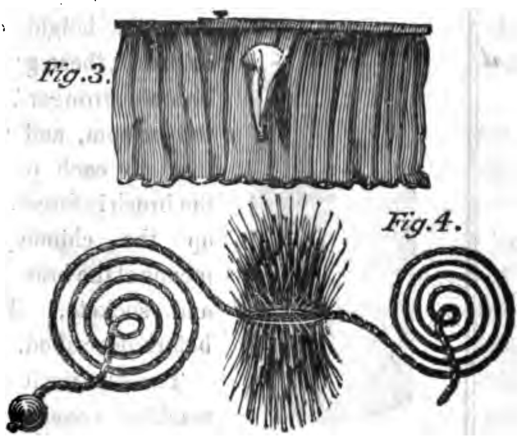
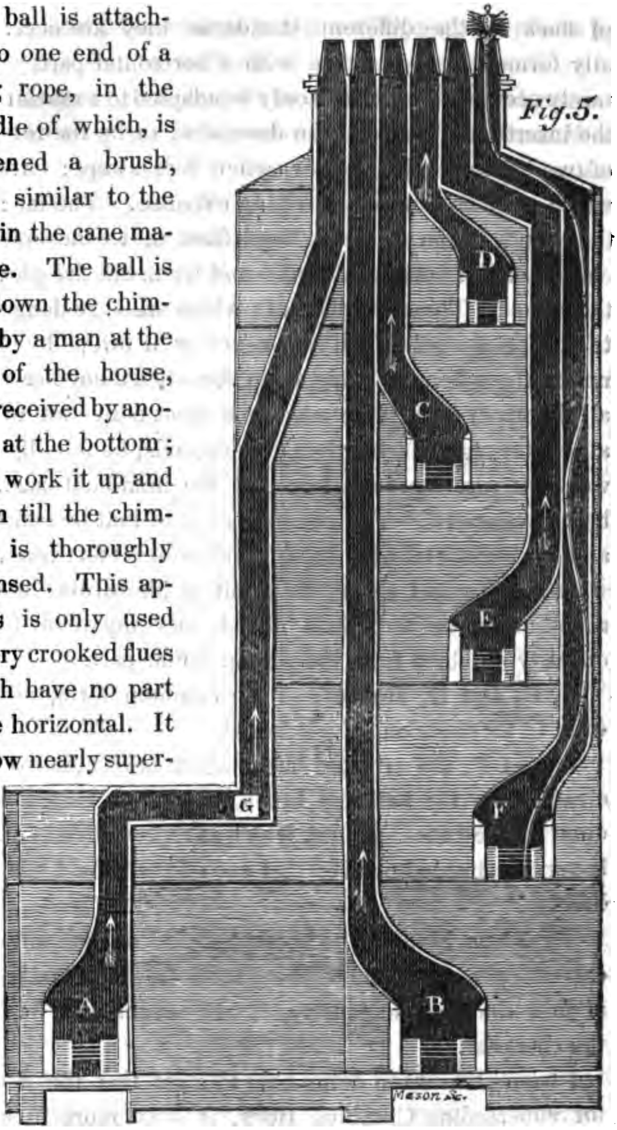


Fig. 4, is an apparatus called the Ball and Brush. An

iron ball is attached to one end of a long rope, in the middle of which, is fastened a brush, very similar to the one in the cane machine. The ball is let down the chimney by a man at the top of the house, and received by another at the bottom; they work it up and down till the chimney is thoroughly cleansed. This apparatus is only used in very crooked flues which have no part quite horizontal. It is now nearly super-

Fig. 5.



seded by the introduction of the cane machine.

Fig. 5, is the end of a house, shewing the sections

of flues in the different stories, as they are occasionally formed. A, is a flue with a horizontal part, which rarely occurs but which can only be adapted to a machine by the insertion of a small iron door at G, or by the removal of two bricks at that corner, when it is swept; either of which may be done at a trifling expense. The machine then works from G, to the top—from G, to the opposite corner of the horizontal part—and from the fire-place to the same. These are the flues which are very dangerous to the boys, and which are never well swept by *them*, unless there is an opening at G; for when a boy has swept all the upper part, there must be a great collection of soot at G; through which, when he descends, he is obliged to work his way by main force, at the imminent hazard of being suffocated. The quantity of soot that he can force along a horizontal part 30, 40, and even 60 feet long, and which is so small as not to admit of his turning himself round, must be very little indeed, in comparison to the quantity obtained from the perpendicular part.

B, C, and D, are flues of the common form, as they exist in 95 cases out of a hundred.

E, and F, are crooked flues, which have hitherto been cleansed by the ball and brush, but which may now be done by the cane-machine, which is represented in F. It is very desirable however that such flues should never be built.

The Cane Machine is recommended on account of its extreme pliability, and as being more durable; and though at first the most expensive, it will eventually be found the cheapest.

I have pleasure in being able to state that the Society for superseding Climbing Boys, is once more in active operation, the greatest obstacle, at present, to the success of their exertions appears to be want of funds.

I hope, that a benevolent public will support its efforts by pecuniary aid, as well as by never permitting Boys in their houses; and beg to acquaint you that Donations and subscriptions are received by the Treasurer, Wm. Tooke, esq. Gray's Inn; the Sub-Treasurer and Hon. Secretary, S. Wood, junior, esq. 8, George Yard, Lombard Street; the Collector, Mr. Paull, 2, Parliament Street; by Messrs. Hoare and Co. Fleet Street; and Messrs. Williams and Co. Birchin Lane. I am, Sir,

Yours, &c. S. W.

Tottenham Green, 9th April, 1828.

Art. X.—On the Formation of a National Repository of Works of Art.

Having in our Journal for December noticed the exhibition of National Industry at Paris, which attracted so much attention in the autumn of last year, and enumerated the various honorary rewards bestowed by the French King upon the most perfect specimens of the Works of Art, we took occasion to ask "what would be the effect of such an exhibition in London?" That question appears to have been extensively discussed, and we have great pleasure in observing that some satisfactory issue is likely to result from our suggestion.

Dr. Brewster, in the last number of his Edinburgh Journal of Science takes up the question in these words: "The editor of the London Journal of Arts, from whose pages we take the preceding statement, asks, What would be the effect of such an exhibition in London? We extend the question by asking, What would be the effects of such an exhibition in London, Dublin, and Edinburgh? and we venture to answer it.

"The artists of France and of all foreign countries have,

within the last ten years, not only been rivalling those of Great Britain, but in many points they have greatly surpassed them, and the consequence is, that Great Britain is rapidly sinking from the prominent position which it formerly held in the practical, and even in the scientific arts. This is owing to the neglect of the arts and sciences by every successive government by which we are ruled. The concerns of faction, and the urgencies of political, financial, and commercial transactions, occupy all the time and all the anxieties of our Ministers. No applications, however disinterested,—no remonstrances, however eloquent, can make the slightest impression in favour of science and the arts. Even those who devote their time and their money to introduce new arts and new materials of art, without any view to their own advantage, are checked and harrassed by the oppressive regulations of our excise laws, and our custom-house regulations, and are driven in utter despair from their patriotic position.

"In other countries no such obstructions exist. Public boards, whose objects are of a scientific nature, are there composed of scientific and practical men, whereas here scientific and practical men are entirely excluded; and the consequence of this is, that the concerns of these boards are conducted at a most inordinate expense, and all improvements, and all inventions, which are brought forward to promote their objects, are overlooked or rejected.

"To draw public atention to such a state of things,—to give to the useful and scientific arts the same fashion which the fine arts have so long enjoyed,—to collect from every corner of the island into its three metropolitan cities its unseen and its unhonoured inventions,—and to draw genius from its obscure retreats, would be a few of the effects of a biennial exhibition of British industry

The Society of Arts for Scotland has been struggling to accomplish this by their own means and exertions, but public aid and royal patronage are absolutely necessary to its success; and unless the plan is laid at the foot of the throne by some influential individuals, it will never be effected; and we must continue to brook the mortification, bitter as it is, of witnessing the triumphs of the arts in every land but the land which we love."

We shall at present refrain from making any further comment upon this subject, except to observe that the opinions expressed with so much warmth by our cotemporary are exactly those felt by ourselves, and we believe by every sincere friend to the British nation. Something is doing in this affair, and we wish it every success. From a variety of notices which have within these few days made their appearance in the public prints, we select the following:

"*National Repository.*—An admirable and most praiseworthy design is now being carried into effect, principally under the patronage and auspices of Mr. Agar Ellis, for the exhibition of National Productions in Arts, Mechanics, and Manufactures. Such an annual display has long been a source of wealth, honour, and emulation, in Paris, and we are sure it will have great effect in London. The upper part of the king's Mews at Charing Cross has been liberally assigned to the first exhibition; and workmen are busily employed in making the necessary preparations."—*Literary Gazette.*

What are the plans proposed for carrying these objects into effect, we at present know not, nor who are to be its principle patrons; but one thing we sincerely hope, that this infant project, which promises so much National benefit, will not be allowed to descend into the hands of a political faction, like several of the other *great doings*

of the present day, which profess to promote knowledge and the arts, and to enlighten the multitude.

In our next we shall take further notice of this institution, and if possible, lay the plan proposed to be adopted, before our readers.

Recent Patents.

To Lemuel Wellman Wright, *of the Borough Road, in the County of Surrey, Engineer, for his Invention of certain Improvements in the Construction of Trucks or Carriages, applicable to useful purposes.*—[Sealed 2nd August, 1826.]

The subject of this patent is an improved truck or carriage upon wheels, having a platform or skid capable of being raised by means of levers, which under several modifications is designed to facilitate the transposition of casks and other heavy packages in warehouses, vaults, or other situations where they may require to be shifted from place to place, and piled one upon another, or taken down; and also for the purpose of lowering or raising such casks, or heavy packages from or into carts and waggons.

The several figures of trucks represented in Plate IV, exhibit different modifications of the invention, applicable to particular situations and circumstances.

The truck shewn at fig. 1, is expressly designed for riding or piling hogsheads one upon another, and is in the position for receiving the hogshead from a crane or waggon, the dotted lines exhibit the parts of the truck in their

elevated positions with the hogshead raised, and about to be rolled off to its intended place in the pile.

The skid (which bears the hogshead) is raised by means of curved racks *a, a,* attached to the front parallel arms *b, b,* into the teeth of which racks, pinions *c, c,* (shewn by dots) work, and these pinions are put in motion by a lever, and click box *d,* attached to the middle of the pinion axle.

By raising the lever *d,* the click is made to force round the ratchet wheel, and this ratchet being affixed to the axle of the pinions, causes them to turn and to raise the racks and skid. A succession of strokes of the lever elevates the skid to its required height, and palls, dropping into the teeth of other ratchet wheels, affixed to the pinions, prevent the re-action of the axle and pinions.

After rolling off the hogshead, the skid is lowered by raising the handle *e,* to which chains are attached that withdraw the palls and click from their several ratchet wheels; and the axle being thus released, the parallel arms and the skid immediately descend into the position shewn in the figure.

A further modification of the foregoing contrivance is exhibited in fig. 2, which is a truck designed expressly for unriding sugar hogsheads, and other heavy packages. The figure represents a side view of the truck with the skid elevated, and a hogshead about to be taken down, which is called unriding. The dotted lines shew the same with the skid, and hogshead lowered ready to be wheeled away.

The truck being brought to the pile of hogsheads, the skid is elevated as shewn by means of the winch *d,* which turns two pullies *b, b,* and to each of these pullies a chain *c, c,* is affixed, and passed round the loose pullies *d, d,*

the other ends of the chains being attached to the two front parallel arms or levers *e*, *e*.

It will be seen that by turning the winch *a*, and raising the handle or lever *g*, of the break *f*, that the chains will draw up the parallel arms *e*, and raise the skid as seen in the figure. The hogshead may now be drawn on to the skid by means of chains, secured to the skid, and passed round the hogshead, and attached at the reverse end to a barrel which is to be turned by rotatory arms *g*.

The skid with the hogshead upon it is retained in its elevated situation by the friction brake *f*, the friction strap of which is attached to the hinder axle, and in lowering the hogshead to the situation shewn by dots, the weighted lever *h*, must be raised by hand, when the parallel arms and skid carrying the hogshead will descend by their own gravity.

Figure 3, represents another modification of the improved truck designed for the purpose of stowing pipes or casks of wine, brandy, rum, &c. in vaults and warehouses. This figure shews a side view of the truck bearing a pipe of wine. The skid is raised by the lever or handle *a*, actuating the click box *b*, exactly in the manner described above. The angular levers *c*, *c*, which carry the skid *d*, are worked by chains *e*, *e* ; these chains are attached to large pullies on the spindle of the click box, and at their reverse ends are made fast to other large pullies fixed on the spindle *h*. To this spindle is also attached two small pullies with chains leading to the shorter arms of the angular levers *c*, *c*, and upon the same spindle *h*, there are also affixed two spur wheels *k*, *k*, taking into two corresponding spur wheels *l*, *l*, which likewise carries two other small pulleys similar to the former, and to the last mentioned pulleys chains are attached leading to the other pair of angular levers *c*.

The handle a, of this truck is worked in the same manner as that described in reference to fig. 1, which raises the load to the height, and into the position shewn by dots.

Fig. 4, is a horizontal view of the skid d, d, as attached to the truck in the last described figure, which is affixed to a circular plate p, and this plate with the skid turns round horizontally upon the platform q, q, into a convenient position for depositing the cask upon the heap in a latteral direction (as shewn by dots) at right angles to the position in which the truck stands. At the back end of the skid there is a windlass r, and pullies s, s, to which chains or ropes are to be attached for the purpose of drawing the casks on to the skid, or when the ropes are passed round the smaller pullies t, t, for drawing the casks off the skid, on to the pile. The arms of the skid may be extended as shewn by dots, by turning over upon their joints, for the purpose of allowing them to be introduced in confined situations between the casks. The sides of the skid may also be opened or expanded upon hinge joints at their back extremities, for the purpose of getting under the bilge of the cask when required, to be taken down from the pile.

The patentee proposes another modification in which a rotatory shaft with a right and left-handed screw moves two sliding boxes which draw the chains that raise the levers and skid, but as there may be several other mechanical modes of raising and lowering the skid or bed of the truck, on which the cask or other heavy body is placed, the patentee does not confine himself solely to those above described. [*Inrolled February*, 1827.]

To JOHN SNELSON SHENTON, *of Husbands Bosworth, in the County of Leicester, Plumber and Glazier, for his having Invented or found out certain Improvements in the Mechanism of Water Closets.*—[Sealed 12th July, 1827.]

THESE improvements in the mechanism of water-closets consists in the construction of an apparatus, or combination of mechanism, by which the valves of a water-closet are opened and closed by the act of a person sitting down upon, and rising up from the seat; the improved mechanism therefore, constitutes what may be called, a self-cleansing water-closet, that is, the soil is let out of the basin after every time of using, and a sufficient quantity of fresh water is turned into the basin, and retained therein so as to constitute a stink trap, without the trouble of raising a handle or lever, as in the ordinary construction of water-closets; the particular advantage of which improvements is, that the closet cannot be left in a foul state, and the water retained in the lower part of the basin, prevents the passage of any effluvia from the air-trap below.

The manner in which this improved apparatus is constructed is shewn in Plate V., fig. 1; *a*, is the seat of the water-closet, the side being removed, for the purpose of exhibiting the mechanism beneath; *b*, is the basin, having a pan, dish, or valve at the bottom, of the ordinary construction; *c*, is the closet or vessel into which the soil is passed from the basin; *d*, is the soil pipe, leading to the air trap; *e*, is a reservoir of water, shewn in section, which may be placed in any convenient situation above. The water passes from the reservoir through the service box *f*, and the pipe *g*, to the basin.

A person stepping upon the foot-board *h*, or sitting upon the seat *a*, will cause the right angle bar *i*, *i*, to be depressed, which bar *i*, being affixed to the seat and to the footboard, and connected by a joint to the shorter arm of the lever *k*, will, by its descent, raise the longer arm of the lever *k*, turning upon a fulcruum at 1, and effect the movements of the mechanism about to be described.

The rising of the longer arm of the lever *k*, lifts the bar *l*, which has a small catch lever *m*, joined to it, and the lower end of this catch lever, by the lifting of the bar *l*, is brought up, and made to act upon the end or nose of the lever *n*, turning upon a fulcruum 2, which is a preparatory movement, for the purpose of opening the dish, pan, or valve at bottom of the basin, when the lever *k*, and bar *l*, descend again. This part of the mechanism is shewn detached upon a larger scale at fig. 2.

The first thing effected by the descent of the seat *a*, and foot board *h*, when a person sits or stands thereon, is to cause a supply of water to pass from the cistern or reservoir *e*, into the service box *f*; which is done by the following means. The bar *i*, descending with the seat and footboard, raises the longer arm of the lever *k*, as described, and this longer arm of the lever being connected by a chain to the end of the lever *o*, (mounted upon a fulcruum 3,) causes that end of the lever *o*, to be raised, and consequently the reverse end depressed, which draws down the rod or wire *p*, connected to it, and the top of this rod or wire being fastened to the longer arm of a lever *q*, mounted upon a fulcruum 4, above the cistern or reservoir *e*, the longer arm of that lever is depressed also.

Near the middle of the longer arm of the lever *q*, a chain or wire is attached, which suspends the valves *r*,

and *s*, coupled together by links, within the service box *f*; by the descent, therefore, of the longer arm of the lever *q*, the valve *r*, falls, and by opening the upper aperture, allows the water to flow from the cistern into the service-box *f*; and at the same time the valve *s*, being permitted to rest upon the bottom part of the service box, closes the lower aperture, and prevents the water from escaping through the pipe *g*.

The water thus admitted into the service box *f*, flows also into the float box *t*, and consequently raises the float *u*, which is a hollow vessel. The float being connected by a wire or rod to a lever *w*, (turning upon a fulcruum 5,) as it rises, lifts the shorter arm of the lever *w*, also, and the longer arm of this lever, that is its reverse extremity having a rod or wire *x*, attached to it, and leading down to a lever *g*, below causes the lever *g*, which moves upon a fulcruum pin at 6, to be depressed by the rising of the float in the manner described.

The service box and float box being now full of water, the supply remains there ready to be passed through the pipe *g*, into the basin, for the purpose of cleansing it, which takes place when the person rises from the seat; all the parts of the mechanism remaining till then quiescent, and in the positions shewn by dots

On the person rising from the seat *a*, and stepping off the foot board *h*, the bent bar *i*, is immediately thrown up by the gravity of the weight at the end of the longer arm of the lever *k*. The lever *o*, is by that means allowed to assume its former position, and to raise the rod *p*, which permitting the longer arm of the lever *q*, to rise, causes the valves *r*, and *s*, to be drawn up; the former closing the upper aperture of the service box, and preventing any more water flowing into it from the cistern, while the valve *s*, being raised off its seat permits the

water contained in the service box, and float box, to flow out through the pipe *g*, into the basin *b*. At the same time the desent of the longer arm of the lever *k*, brings down the bar *l*, and the lower end of the catch lever *m*, connected to this bar, pressing upon the nose of the lever *n*, (seen more evidently in the detached fig. 2) by the descent of the bar *l*, throws up the longer end of the lever *n*, as shewn by dots in fig. 2, for the purpose of opening the dish, pan, or valve at bottom of the basin, which lets down the soil into the box *c*, below. The dish at bottom of the basin is opened in the usual way by a crank *z*, connected to the longer arm of the lever *n*, and hence by the rising of that lever the dish or valve is opened.

In order that the dish or valve should not close instantly after discharging the soil, but remain open long enough for it, and the basin to be perfectly cleansed by the flowing of the fresh water, the float *u*, is employed. This float is raised in its chamber or box *t*, by the water, which flows from the cistern into the service box in the way above described, and when the water is allowed to pass away through the pipe *g*, the float *u*, descends gradually, by means of which the lever *y*, connected to it through the lever *w*, and rod *x*, as already explained, is made to rise, and a small friction roller mounted in this lever *y*, acting against the under side of the catch lever *m*, by the rising of the lever *y*, lifts the catch *m*, until its lower end slips off the nose of the lever *n*, and allows that lever to assume its former position, and the dish or valve at bottom of the basin to close, when the water continung for some short time longer to flow from the service box through the pipe *g*, into the basin, the lower part of the basin, and the dish becomes filled with water, which acts as a stink trap, and perfectly prevents any

effluvia from passing from the pipe or vessel below into the apartment.

The patentee concludes by saying, though I have described fully the several parts of the mechanism of the improved water closet, yet I wish it to be understood that I do not claim every part of the said mechanism as new, or of my invention, I therefore desire it to be remembered, that the particular features of my invention are the bar *l*, the catch lever *m*, the float *u*, and the appendages to work the same however formed for the performance of the actions, and the accomplishment of the objects before stated. [*Inrolled September*, 1827.]

To ROBERT DAWS, *of Margaret Street, Cavendish Square, in the County of Middlesex, Upholsterer, for his Invention of certain Improvements on Chairs or Machines, calculated to increase ease and comfort.*—[Sealed 28th April, 1827.]

THE object of this invention is the construction of a chair or sofa for the use of invalids, the back and arms of which are so made as to be capable of having their positions shifted, in order to allow a person to sit or recline in any attitude that might be found most easy, agreeable, and condusive to their comfort.

The exact form or fashion of the chair or couch is of no importance, that shewn in Plate V, fig. 3, is a chair of the Grecian kind, and is exhibited merely for the purpose of explaining the proposed improvements.

The back of the chair is attached to the lower part by joints or hinges as at *a*, which enables it to recede in the manner shewn by dots. The arms of the chair are also attached to the back by joints or hinges as at *b*. The

front supports of the arms are not fixed to the seat, but the lower parts of them are tenons or blocks *c*, let into mortice holes in the framing of the seat, in which they are enabled to slide. These last mentioned parts are shewn in the figure, by having cut away a portion of the side rail, by which so much of it is exhibited in section, as will explain the construction. The blocks and supports of the arms are prevented from rising out of the mortice holes by a confining pin passed through the lower part.

On the side of the mortice hole there is a small ratchet *d*, and a click or pall *e*, is inserted in the support of the arm, which click is intended to take into the ratchet. At the back of the click there is a small rod *f*, which passes through the wood work, and its extremity being pressed upon by the thumb of a person sitting in the chair, raises the click or pall out of the ratchet, and the click or pall being thus withdrawn from the teeth of the ratchet, the block *c*, is enabled to slide along the mortice to any desired extent, the arm receding by that means into the situation shewn by dots, and the back of the chair, at the same time falling into the reclining position.

Instead of the ratchet and click, a series of holes in the side rail may be made, and a corresponding hole in the block, with a pin to pass through in order to fix the arms, and the back in any required position. Another method of shifting the arm is by allowing one part of it to slide within another as a socket and plug; or a cord or chain passed over pullies to be turned by a winch instead of the ratchet and pall, and in several other ways in which the same may be effected. The patentee considers however that these modes will readily suggest themselves to any competent workmen, and therefore thinks it

fully sufficient to have explained the principle of his invention by the above figure.

In sofas the ends are to be hinged to the seat, and the back to slide upon the back rail, with click and ratchets to fix it in any situation.

The specification concludes by saying, "I claim the construction of chairs, the inclination of the backs of which are regulated by sliding or moving arms, and retained in any position by clicks, catches, or pins, or other stops; and also other similar machines, the inclinations of the ends or arms of which are regulated by sliding backs as above said." [*Inrolled October*, 1827.]

To THOMAS DON, *of Lower James Street, Golden Square, in the Parish of St. James, in the City of Westminster, Mill-wright, and* ANDREW SMITH, *of Well Street, Oxford Street, in the Parish of St. Mary-le-bone, in the County of Middlesex, Builder, for their Invention and discovery of methods of making and constructing Shutters and Blinds of iron or steel, or any other metals or compositions thereof, and improved methods of constructing and fixing Shutters and Blinds of iron or steel, or any other metals or materials, and methods of uniting in shutters the double properties of Shutters and Blinds.* [Sealed 15th June, 1827.]

THESE improvements on shutters and blinds consist in forming such shutter and blind of metal instead of wood, by inserting metallic plates of any required dimensions into metal frames suited to the form of the window to which they are to be fitted, and also in the modes of fitting the said shutters into grooved styles for the purpose of adapting them to windows, and in raising and lowering them in their grooves. Likewise in a method and appa-

ratus for projecting parts of the said shutters, and parts of the styles forward, and converting them into sun blinds, and drawing them back again with their grooved styles, and sliding the said shutters into recesses, for the purpose of concealing them, which said improvements are particularly described and exhibited in the several figures referred to in Plate IV.

Fig. 3, represents the external appearance of the shutters when fitted to close the front of a shop window; fig. 4, is a vertical section of the shutters, and their frames; and fig. 5, is a horizontal section of the same; *a*, *a*, *a*, represent metal plates (iron is usually employed); *b*, *c*, *d*, are bars of metal, which are fixed round each one of the iron plates, and constitute frames for them, the plates being inserted in grooves in those frames.

The several shutters with their frames are intended to slide up and down in grooves in the side styles of the window.

At the lower part of the bottom shutter on each side a staple is affixed, to which cords or chains are attached, and passed over pullies at the top of the window, for the purpose of drawing up the shutter by a winch and axle; the lower shutter having projecting pieces or brackets *b*, which when raised lifts the two upper shutters, and by these means they are all drawn up, and closed into a recess behind the facia or entablature of the shop front, and remain perfectly concealed, and when the shutters are lowered, so as to close the window, they slide down each in its own groove of the styles, and lock together by dove-tail joints, the grooves in the stops being cut to the exact length, or furnished with stops at the points where the shutters are to rest.

Fig. 4, which is a section of the shutter, and of the window frame, shews the contrivance for throwing a part

of the shutter and its style out, and converting it into a sun blind.

In this instance, portions of the styles of the windows in which the grooves are formed for the shutters to slide, are on each side made moveable upon joints *e*, opening in the direction of the dotted lines. There may be various methods devised of throwing out these shutters, but that which is most approved of, is shewn in this figure.

By turning the winch and ratchet *f*, the cord is wound upon the ratchet barrel, and the lower shutter drawn up. When the lower shutter has been thus raised a short distance sufficient to release the dove-tailed catch from the second shutter as in the figure, then the side frames or styles may be opened, and with the shutters thrown out, turning upon the hinge joints as shewn by dots, this is done by placing the winch on the axle of the ratchet *g*, which has a pinion upon it, and this pinion being turned by the winch draws down the rack bar *h*.

The upper end of the rack bar is connected to a rod, and this rod to a crank or sector *i*, which turns upon its fulcruum joint, the sector being affixed to the moveable style. It will hence be perceived, that the lowering of the rack bar in the manner described will cause the two upper portions of the shutter to be thrown out in the direction of the dotted lines, where the blind will remain, being held fast by the ratchet *g*. The other ratchet *f*, must now be turned by the winch, and the lower shuttle drawn up into the facia.

In some instances, it will be necessary to employ side or end blinds, which must be made of stuff, linen, cloth, or any other flexible material, and in that case, one end of the blind must be attached to that portion of the style, which contains the two shutters, and the other end to the conical

roller *k*, or it may be connected to it by a cord passed over that, and a second conical roller. When the blind is drawn in, and the style brought to its perpendicular place on the side of the window, the conical rollers will be turned by the weighted cord *l*, and the flexible blind wound upon or round the conical rollers, in which situation the side blinds remain when out of use.

All this apparatus for working the blind may be enclosed in a shallow recess within the window, and completely hidden from observation.

In order to keep the shutters fast when closed, and prevent them from being opened, or raised on the outside, spring catch bolts are let into the styles above the lower shutter, or any other well known fastening may be employed, which will prevent the lower shutter from being raised, and consequently keep the other shutters properly fastened; and by introducing another catch at the bottom of the shutters, when they are raised up into the facia, they will be prevented from descending until this catch-bolt is removed. These catches may be withdrawn by pullies or handles on the inside.—[*Inrolled August*, 1827.]

To VALENTINE BARTHOLOMEW, *of Great Marlborough-Street, in the Parish of St. James's, Westminster, in the County of Middlesex, Gentleman, for his Invention of Improvements in Shades for Lamps, and other Lights.* [Sealed 21st December, 1826.]

THE patentee proposes to construct a lanthern of an octagon or any other eligible form, with ornamental framework, and panels of painted glass, or other transparent medium, which lanthern is to be put over the lighted lamp, and the subjects contained in the transparent panels

by that means are illuminated. The frame-work of the lanthern is made to imitate a gothic building, the transparent panels representing windows.

Over the burner of the lamp, which may be of gas or oil of the Argand or any other construction, an arched wire is carried, having a point at top to support and suspend the lanthern, and the aperture in the upper part of the lanthern for ventilation, is covered by a fan, in the centre of which there is a small hollow, intended to bear upon the central point when the lanthern is placed over the lamp, and equally poised.

The heat of the lamp rising to the top of the lanthern, creates a current of air, which in its passage through the fan, turns the fan and the lanthern slowly round, upon the centre or supporting point, and thus by the rotation of the lanthern, the transparent subjects are successively brought into the view of a spectator.

We are not aware what particular feature of novelty appertains to this invention, nor what the patentee intends to claim as his invention, as lantherns with transparent printing have been in use for ages, and are commonly called Chinese lantherns. As to the rotatory motion produced by the heated air passing from the burner through the fan at top, that is a simple philosophical experiment which we have known for many years applied exactly in the same way.—[*Inrolled February*, 1827.]

To JOHN HAGUE, *of Cable Street, Wellclose Square, in the Parish of St. George in the East, in the County of Middlesex, Engineer, for his Invention of a New Method of working Cranes or Tilt Hammers.* [Sealed 30th August, 1827.]

THESE proposed novelties in working cranes, and tilt hammers, consist in the adaptation of an atmospheric

engine, in which a piston is made to reciprocate within a cylinder, by the pressure of air on one side of the piston acting against a vacuum on its opposed side, the piston rod being connected to a crank, by means of which a rotatory motion is given to a series of toothed gear, instead of working the gear by manual labour or other power, as in the ordinary construction of cranes. The tilt hammer is raised by a similar kind of atmospheric engine, the piston rod being attached to the under part of the lever which carries the hammer.

Plate IV, fig. 5, exhibits a crane with the atmospheric engine attached to it; *a*, is the perpendicular post or standard mounted in a plate *b*, in which it turns round horizontally as other cranes do, the lower extremity of the post being set in a step; *c*, is the barrel upon which the suspending rope or chains is coiled as the heavy goods are drawn up.

The cylinder *d*, is mounted upon a bracket in front of the main post, and is attached by a pivot or axle to the bracket, for the purpose of being enabled to turn or vibrate in a vertical direction. A working piston is placed within the cylinder *d*, properly fitted with packing in the same way as the piston of a steam engine, and the piston rod *e*, extends for some length outwards, and is connected to a crank *f*.

An air pump is to be placed at some convenient distance from the crane, and worked by a steam engine, or other power by means of which the air is to be extracted from the tube *g*; a pipe *h*, leads from the tube *g*, and after passing downwards towards the foot of the crane, rises upward, and is connected to the valve box *i*, at the side of the cylinder. Through this pipe *h*, the air is withdrawn from the cylinder *d*, by means of the continued action of the air pump, and a vacuum being thus produced

on one side of the piston, the atmospheric air, which passes through the valve box *i*, to the opposite side, drives the piston with considerable force.

In starting the engine, the valves in the box *i*, are required to be turned a few times, which may be done by a small handle, in order to open and shut the vacuum, and air passages; by which means the piston will be driven to and fro in the cylinder, alternately on either side of the piston, by the pressure of the air acting against the vacuum, and the extremity of the piston rod being connected to the crank, the force by which the piston is driven will be communicated to the crank, and by that means the crank shaft will be made to revolve, and to drive the train.

Upon the piston rod there is a slider moving up and down between two guide bars fixed to the cylinder, for the purpose of keeping the piston rod in the centre of the cylinder, as it slides in and out, and as the crank goes round, the cylinder will be made to vibrate vertically upon its axle or pivot, accommodating its position to the situation of the crank upon which it is required, to make a direct stroke.

The piston being thus put in motion, and the crank made to revolve, the vibrations of the cylinder caused by the rotation of the crank will open and shut the valves *i*, and consequently the ends of the cylinder will be alternately exhausted by the air pump, through the vacuum pipes, and at the same time the air admitted at the opposite end of the cylinder, will drive the piston forward into the vacuum, and produce the stroke which gives the required mechanical force.

The piston being put in action in the manner described, and the crank thus driven round, a pinion *k*, on the crank shaft, takes into a toothed-wheel *l*, and another pinion on

the axle of the wheel *l*, drives the toothed wheel *m*, to the axle of which the drum or barrel *c*, is fixed, and by that means the draft chain or rope is wound up. Thus the working piston drives the train of toothed gear which works the crane, for the purpose of raising any heavy body, and the actions of the whole are regulated by a fly wheel on the crank axle.

When this crane is not required to be in operation, the small cock *h*, in the vacuum pipe must be closed, which cuts off the communication of the air pump with the cylinder of this engine, while other cranes situate in different parts of the warehouse or wharf, are worked in the same way by their connection with the vacuum tube *g*.

Fig. 6, represents the manner of working a tilt hammer; *a*, is the main post upon which the fulcrum of the hammer rests; *b*, is the lever; *c*, the hammer; *d*, the anvil; *e*, the atmospheric engine; *f*, a close vessel intended to be exhausted by means of a steam engine; *g*, is the vacuum pipe leading from the exhausted vessel to the cylinder of the atmospheric engine through the valve box *h*. A small handle, or some such contrivance is to be adapted to the valve *h*, for the purpose of alternately opening and shutting the apertures by which the exhausted vessel withdraws the air from the cylinder, before the piston and the atmospheric passage admits the air into the cylinder behind the piston.

By these means the tilt hammer is made to rise and fall; and when its operations are to be suspended, the connexion between the engine and the exhausted vessel may be closed by turning the cock *i*. The mode of constructing the tilt hammer may be varied from that shewn in the figure, the invention consisting solely in working a tilt hammer by an atmospheric engine as described.—[*Inrolled October* 1827.

To JOHN GREGORY HANCOCK, *of Birmingham, in the County of Warwick, Plate Bender and Canister Hinge Manufacturer, for his Invention of a New Elastic Rod, for Umbrellas, and other like purposes.*—[Sealed 21st December, 1826.]

THESE elastic rods are made from ozier twigs, cut to any convenient length, and the pith removed from the internal part of the ozier twig by an ordinary boring tool. When this has been done, a rod of steel is introduced into the hollow part of the twig for the purpose of giving it stability.

The external part of the ozier twig may be now scraped or plained down, and finished by painting and varnishing, and ferrules or shoulders may be attached to the rod as may be required, for the purposes of sticks, whips, or the stems of umbrellas, or any other purpose to which these rods may be applicable.

The patentee claims to be the first inventor and maker of rods formed in this way.—[*Inrolled January*, 1827.]

To WILLIAM LOCKYER, *of the City of Bath, Brush Maker, for his Invention of an Improvement in the Manufacture of Brushes of certain descriptions, and in the Manufacture of a Material or Materials, and the application thereof to the Manufacture of Brushes and other purposes.*—[Sealed 28th April, 1827.]

THE proposed improvements apply to the manufacture of a particular description of brush employed by plasterers called a stock brush.

The patentee states, that he takes a piece of elm or other suitable wood, about a quarter of an inch thick, and ten inches wide, formed with a handle at the back, suited

for a plasterer's brush. Into the front edge of this piece of wood he bores the required number of holes, about a quarter of an inch deep, and one-eighth of an inch diameter. The bristles are then tied up in small bunches, having previously dipped their stems in a cement in order to fix them tight.

The bunches of bristles being now stuck into the holes in the wooden stock, a strip of zinc, about three quarters of an inch wide, is nailed round the stock, half of its breadth resting on the wood, and the other half pressing upon the bristles.

By this mode of making stock brushes, they will not be so subject to splash when employed by plasterers for washing, as when constructed in the old way. The cement to be employed for fastening the bristles, is to be compounded of seven-eighths pitch, and one-eighth shell-lac, melted together over a slow fire.

The patentee claims the application of the improvement as described to the making of plasterer's stock brushes, whether this cement is employed or not.—[*Inrolled October*, 1827.]

To John Whiting, *of Ipswich, in the County of Suffolk, Architect, for his Invention of certain Improvements in Window Sashes and Frames.* [Sealed 9th January, 1827.]

The specification of this patent (without describing the objects proposed) states that the invention will be fully understood by the following drawings and description.

Plate V, fig. 7, is a plan or horizontal section of the window frame, and part of the sash. Fig. 8, a vertical section of the sash taken at the meeting bars; *a*, is the sash frame; *b*, *b*, two grooves for the sash weights to pass up and down; *c*, *c*, *c*, fillets secured to the sash frame; *d*, *d*,

grooves in the fillets for the cords or sash lines to work in. The cords or lines work over pullies or wheels fixed in the sash frames near the top; e, are the sash stiles; f, metal sockets set in the sash stiles with eyes or tubes, in which the cords or lines work.

In fig. 8, g, g, are the meeting bars of the sashes; h, pieces of iron, bent at right angles, for the purpose of holding the meeting bars together, and excluding the air.

This explanation does not convey to us a very perfect notion of the invention, but such as it is we give it to our readers. [*Inrolled March*, 1827.]

To James Barron, *of Birmingham, in the County of Warwick, Brass Founder and Venetian Blind Maker, for his Invention of a combination of machinery, or apparatus for Feeding Fire with Fuel; which machinery or apparatus is applicable to other purposes.* [Sealed 24th July, 1826.]

The mode of feeding fires, proposed by the patentee, and which we presume is principally intended for the furnaces of steam boilers, is effected in the following manner:—A long perpendicular iron tube is erected nearly over the furnace, which tube is divided into a series of compartments, one above another, by flaps or falling bottoms. On the side of the tube a number of boxes or triangular prism form trays are placed, opposite to the several compartments of the tube. These trays are suspended upon pivots in a frame, each of them filled with coals, and being nearly balanced upon their pivots, a small force acting on one side, will turn over each tray and empty the coal into the tube, whence it falls down upon an inclined shute at bottom, and slides into the furnace.

The particular intention of this arrangement of the coal

boxes is to connect a clock movement to the apparatus, by means of which the several trays of coal may be emptied, at certain intervals apart, one after another, and thus the furnace fed with small quantities of fuel every few minutes until the contents of all the trays are discharged.

At the back of the trays there is a perpendicular sliding bar, which is suspended by a chain or cord, connected to a going clock; as the time proceeds, the clock draws up the perpendicular bar, which first taking hold of the lowest tray, turns it over on its pivots, and discharges the coal into the perpendicular tube. At the same time the flap or bottom of the compartment falls back upon its hinges, and the coals descend to the inclined shute or bottom, and slide into the furnace.

The click having drawn the perpendicular bar up a little higher, the second tray is now turned over, and its coals discharged down the tube as before, and so on, the perpendicular bar ascending and turning the trays over in succession, until they are all emptied.

The general arrangement and plan of this apparatus being understood, it is obvious that the particular details of the parts will admit of variation, as circumstances and situations shall render desirable.

But there is one more feature which must not be omitted. It is proposed to rake the grate of the furnace in order to clear its bars of dust and cinders at the time that the coals are discharged. This is done by the coals in their descent falling upon a plate which is mounted upon a lever, a toothed rake being attached to the reverse end of the lever. Thus the depression of the plate raises the rake, and causes its points to be protruded into the furnace at the under part of the bars, and consequently to rake the cinders into the ash-hole.—[*Inrolled January*, 1827.]

Review of Books.

A History of the Life and Voyages of Christopher Columbus. By WASHINGTON IRVING. 4 *vols.* 8-*vo. London, Murray*, 1828.

NOVELISTS may be amusing historians of national manners, but their writings seldom tend to illustrate the subjects of scientific literature. The name of Washington Irving prefixed to any work is, however, in itself, a sufficient earnest for liberal sentiments and graceful composition. Characters who lived and flourished nearly four centuries back, are brought to the mind's eye with a vividness of colouring, and an accuracy of portraiture, unequalled by any other trans-atlantic writer.

The value of Columbus's discoveries will be best illustrated by a reference to the state of geographical knowledge in the time of Xerif al Edrizi surnamed the Nubian, an eminent Arabian writer. "The ocean," he observes, "encircles the ultimate bounds of the inhabited earth, and all beyond it is unknown. No one has been able to verify any thing concerning it, on account of its difficult and perilous navigation, its great obscurity, its profound depth, and frequent tempests; through fear of its mighty fishes, and its haughty winds; yet there are many islands in it, some peopled, others uninhabited. There is no mariner who dares to enter into its deep waters, or if any have done so, they have merely kept along its coasts, fearful of departing from them. The waves of this ocean, although they roll as high as mountains, yet maintain themselves without breaking; for, if they broke, it would be impossible for ship to plough them."

It is generally admitted that Columbus supposed an

open sea to interpose between Europe and Asia. Ptolemy, whose authority no scholar ventured to question, had divided the equator into twenty-four hours, of fifteen degrees each; and of these, fifteen hours were supposed to be known to the ancients, extending from Gibraltar or the Canaries, to the city of Phinæ, the eastern boundary of the known world. The Portuguese, by advancing to the Azores, had discovered one more, and therefore there remained eight hours, one-third of the globe yet unexplored; and how much of this was filled up with the undiscovered parts of Asia, who could tell? The length of a degree, too, had been supposed to be not more than fifty-six miles, which again lessened the intervening space. Then again, according to the narratives of Marco Paulo, and Sir John Mandeville, Cathay extended far beyond the boundaries of ancient knowledge, and islands, particularly Antille and Cipango, lay still beyond, so that, on the whole, the probability seemed to be, that either these islands, or the continent of Asia, were within 4,000 miles of the Portuguese coast. That lands really existed in the western direction, there were numerous indications; a pilot, for instance, sailing 450 leagues to the west of St. Vincents, had picked up a piece of carved wood, evidently not manufactured with an iron instrument. In Porto Santo, again, a similar piece of wood had been taken up, drifted from the same quarter. Reeds of an immense size had floated from the west, such as Columbus imagined had been described by Ptolemy as growing in India. At the Azores, again, trunks of immense pines had come ashore, and two dead bodies, with features differing from every known race of men. The probability, then, in the mind of Columbus, rose to certainty, that India was approachable in this direction, and of course, by a much shorter route than by circumnavigating Africa, supposing it

inde to be circumnavigable, which supposition, however, depended solely upon the reports of the ancient geographers, for no one had yet gone beyond the south of the equator.

With a belief thus fixed, he dwelt upon the thought, till he believed himself destined, and especially appointed by Providence, to open this western route to Asia, and he accordingly in the words of a cotemporary historian "moved heaven and earth to accomplish his destiny." John II. of Portugal, though himself not indisposed to adventures, was urged in vain; his counsel pronounced the scheme chimerical, though an under-hand attempt was made by certain influential persons to ascertain the truth of his story, and anticipate the glory, by dispatching vessels; which, however, effected nothing. Indignant at this treatment, Columbus appealed to Spain; but Spain was otherwise engaged as the Moors were to be driven from Granada; but at length, he overcame the difficulties which were opposed to him on all sides, after laying siege to the court for seven years. Isabella herself undertook to fit out three small vessels; and, stipulating for the appointment of viceroy over all the lands he should discover, and a share of the plunder, for such it must be termed; and the title of Admiral; all which was finally conceded in the year 1492, then in his 56th year; he sailed from the port of Palos.

After encountering the frequent resistance, and occasional mutinies of his crew, and when despair, if despair could ever find a seat in so sanguine a breast, had perhaps almost seized himself, he came suddenly upon the Bahamas, and made his first landing on what is now called Cat Island; and from thence, sailing along the northern coast of Cuba, onward to the west, he came to Hispaniola, where one of his vessels was wrecked, and another,

commanded by Pinzon deserted him. Here, then, proposing to return to Spain for reinforcements, he built a fortress which he named La Navidad, uninterrupted by the natives. Every where indeed he found them gentle, confiding, easily conciliated, in a state of absolute nudity, the country beautiful and fertile, but wealth there was none. Small pieces of gold were seen on their persons, and with these they readily parted for toys; and observing the eagerness with which gold was seized, they made signs that there was abundance in the distant mountains. Thus much accomplished; and with this intelligence, Columbus lost no time in returning to Spain, leaving thirty-nine men at the fortress, with special directions to survey the Island, and collect all the gold in their power, hoping, as he said, to find on his return, a ton of it, and that in three years, wealth enough would be obtained to conquer Jerusalem and the Holy Sepulchre.

Narrowly escaping shipwreck, and some treachery on the part of the Portuguese, he at length reached Spain, and was received with the very highest marks of distinction by his sovereigns, even to seating himself in their presence, and active preparations were forthwith made to start him afresh with augmented resources. Ferdinand's rapacity was now inflamed by Columbus's magnificent anticipations no less than the means of leading 50,000 foot, and 10,000 horse against the infidels. In the following spring, he set sail with a fleet of seventeen ships, and 1,500 men on board. The first land he made this time, was Dominica; from discovering it on a Sunday; and after cruizing some time among what are now termed the Windward Islands, he arrived at La Navidad, when he had the misery and mortification to find nothing but destruction, and not a soul left to tell the tale of their fate.

But the immediate cause of the great Admiral's r

verses, was the disorder and confusion in which he found on his landing at Hispaniola, in his third voyage, the affairs of that island had fallen during his absence, under his brother's administration.

His brother Bartholomew, being left in command, Roldan who was also a *protégé* of the Admiral's, disputed his authority. The consequence of this and other cabals, was the ruin of the prosperity of the colony, the suspension of the mines, and the extinction of the hopes of unbounded wealth. The horrors of famine followed close upon those of war. Nor was the presence of the admiral able to do do much; he issued proclamations, and did all in his power to enforce order and obedience, and was at last obliged to accommodate with Roldan on his own terms. Other mutinies of officers, and revolts of the natives, followed thick upon each other, while some, who had been expelled from the colony, returned to Spain, and made the most outrageous mis-representations of his conduct to the court, and the King, indiscreetly, to say the least, commissioned Bobadilla to go to St. Domingo, and inquire, and moreover, empowered him, if he found the admiral guilty of crimes, or extraordinary imprudence, to supersede, and send him home. Of course, Bobadilla's first step was, not to enquire, but to supersede, and, without further ceremony, he threw Columbus in chains, and dispatched him to Spain.

Ferdinand and Isabella, however, hastened to make reparation to Columbus for the shameful indignity to which he had so unworthily, and so contrary to their intentions, been subjected. Bobadilla was immediately recalled, and the admiral was restored to all his honours, and emoluments, except the viceroyalty of the Indies. But in thus withholding the restitution of the absolute authority over the newly-discovered countries, for which

Columbus had originally stipulated, Ferdinand was assuredly guilty of a gross breach of contract. Far too great as were the powers claimed by Columbus, to be delegated with safety to any subject, they had not the less been deliberately conceded to his demands in the outset; and though political expediency has often been pleaded with less weighty excuse, for the violation of treaties, the chicanery of Ferdinand in this transaction, so consonant with his wily and perfidious character, must be condemned upon every true principle of morality and honour.

Our limits will not, however, permit of further analysis, but one thing appears certain, that much of the failure that attended the various expeditions of this distinguished navigator, arose from an over-weaning desire to possess unbounded authority. He was peremptory on points that he could not demonstrate. Neither had he taken a due measure of his crew and agents. He looked upon them as machines, and they regarded themselves, incurring such risks as they did, as fellow-adventurers and companions. His right of enslaving his fellow-men, a subject that appeared to the navigator as plain as the sun at noonday, would now also be much canvassed. Indeed, the christian precept of all men being brothers whatever their complexion or geographical situation, was held by him as a doctrine fit only for priests, and monkish advocates of liberalism. But we must close our remarks, by recommending the author, in his next edition, to reduce his present voluminous work to half the number of volumes, as it will materially increase both its interest and value.

Introduction to the Science of the Pulse, applied unto the Practice of Medicine. By Julius Rucco, M. D., *&c. &c.* 2 vols. royal 8vo. *London.*

Man is, indeed, fearfully and wonderfully formed, and

this truth is in no shape better illustrated than by a reference to the pulse. The natural Philosopher is enabled to construct a series of mechanical arrangements, for the use of hydraulic machines, which bear a mimic resemblance to this elaborate part of the human frame, but how far are they behind the series of valvular communications, which serve to convey the sanguinous fluid, for the pulse consists of a series of successive dilatations, and contractions of the arteries, in consequence of the successive impulses given to the blood through them by the repeated contractions of the heart.

It is not above a century since the pulse was first counted, or a standard of its natural frequency accurately established. Sir John Floyer appears to have been the first who applied a portable instrument to the purpose under the name of the pulse glass.

With respect to the natural standard, to which the comparative terms *quick* and *slow* must be referred, there has indeed been considerable difference in the statements of different physicians. The average number of the pulsations in an adult man in good health, between thirty and forty years of age, is estimated at about seventy three in a minute; but the pulse of women of the same age and condition is somewhat quicker. Kepler, who estimated the mean pulses of man at seventy in a minute, estimated those of women at eighty, or at one-seventh more; and Dr. Falconer considers the difference to be in about the same proportion, calculating the ordinary pulse of men at seventy-five, and that of women at eighty-four. Dr. Bryan Robinson has given a table of pulses according to stature, taking six feet as the standard, at which height he found the pulse to be sixty-five, and computing upon this rule, which he says was founded upon a great number of observations, that the mean pulses of well-proportioned

bodies were to one another inversely, as the biquadrate roots of the cubes of the lengths of the bodies. Senac held a similar opinion, but his computation was somewhat different. He states the following proportions, namely, at two feet, pulse ninety; at four feet, pulse eighty; at five feet, pulse seventy; and at six feet, pulse sixty; the last number of which, he says, was deduced from observation of one hundred men of the Royal Guards, who were selected for that office on account of their tallness of stature.

Dr. Rucco's book of which it is impossible to furnish an adequate analysis, brings together every thing that has hitherto appeared on this important subject, and his extensive practice as a physician, has enabled him to verify by actual experience, the various physiological facts with which it abounds. So that the absurd theories and vague hypothesis with which the science of the pulse was originally encumbered, may now be considered as completely swept away. We need hardly add that so useful a work should find a place in every Medical library.

Novel Inventions.

Economical Mode of Boiling Water.

Most of our London readers have no doubt seen the blow-pipe apparatus, now employed for domestic uses. It is intended for the purpose of boiling small quantities of water, and the cost is about fifteen shillings. A more unphilosophical apparatus could hardly have been contrived. It is complex, while its complexity tends to destroy the material of which it is composed. A strong blast is impelled against the side of a vessel by a stream

of alcohol, and the effect must, of necessity, be the speedy oxidation of the vessel itself.

The accompanying diagram serves to illustrate the form of an apparatus much more effective, and which may be purchased for one tenth of the money. It consists of a small metal vase, placed in a tray, and furnished with a little cotton wool for holding the pyroligneous ether, which may be advantageously substituted for alcohol. The cost of boiling a small vessel of water, will never exceed one farthing.

Ultra-marine.

It has been reported to the Académie des Sciences, that M. Tunel has discovered the means of making an artificial ultra-marine, which is finer and more brilliant than the natural; and which he can afford to sell at less than half the price of the natural. The process is a secret.

Pyroligneous Acid.

A tanner in Hungary uses with great advantage the pyroligneous acid in preserving skins from putrefaction, and in recovering them when attacked. They are deprived of none of their useful qualities if covered by means of a brush with the acid, which they absorb very readily.

Application of Windmills to Ships' Pumps.

The brig Hannah, Captain Bartlett of Plymouth, in her outward passage, having sprung a leak, it required 3000 strokes of the pump, per hour, to clear the water that was thus introduced; and had it not been for a windmill which had been previously attached to the pump by Cap.

tain Bartlett, the ship must have filled; as all the crew were completely exhausted with constant pumping, and were exposed to continuous gales for thirty-five days. When blowing fresh, the mill would make 2461 strokes of the pump per hour.

Method of obtaining the Figure of a Plant.

A piece of paper is to be rubbed over with powdered dragon's blood, in the manner practised by engravers, and then the small branch or leaf, of which the design is required, is to be laid upon it; by means of slight friction it soon takes up a small quantity of the powder, and being then laid upon moistened paper, an impression is to be taken in the manner practised for lithography, without a machine. This process may be usefully employed for preserving certain physiognomical and characteristic features, which cannot be retained by drying the plant.—*Bull. Univ.*

Magnificent Achromatic Telescope.

We have lately been informed by one of our scientific countrymen now in Paris, that M. Lerebours, an eminent French optician, has executed an achromatic telescope, with an aperture of twenty-four inches, and a focal length of twenty-five feet. The object-glass is made of M. Guinand's glass. The telescope cost about £1670, and the stand about £415, making in all about £2080. It has been now about three months in the Observatory, but no good opportunities for observing with it have occurred. Whether this grand instrument turn out well or ill, its execution does honour to the spirit and genius of the French nation, and to the monarch in whose reign it has been made.—*Brewster's Journal.*

Polytechnic and Scientific Intelligence.

London Literary and Scientific Institution.

THE new Theatre which has been recently erected by this institution in Aldersgate Street, for the accommodation of its members in attending Lectures on Science and Literature, was opened for the first time, on Friday evening, the 25th instant, when an inaugural address was delivered by Thomas Denman, Esq. *Common Serjeant of London.*

The company assembled on the occasion was extremely numerous, among whom we observed many gentlemen of the first respectability and consequence in the city: several members of parliament, and other well-known patrons of the Arts and Sciences.

The learned Serjeant commenced his address by complimenting his fellow citizens on the good taste which they had displayed, and their anxiety evinced for the cultivation of Literature and Science in raising this Institution within two years from its first formation, to the station of importance which it now assumed among other institutions of the metropolis. The meritorious efforts which were making to enlighten the working classes of society, imperiously called upon the more respectable order of citizens to push forward, and not suffer their heels to be trodden down by those who were following behind. The wealth and happiness of a nation always rose in proportion to her zeal in the cultivation of useful knowledge. The selfish individual who felt satisfied with his own ease, and cared not for the interest or happiness of his fellow-men, was a worthless clog upon society, for there was no man, whatever his station, but might be a useful member of the community.

The learned speaker took an extensive view of the many situations in civil and political society which the different individuals who heard him might be called to fill, from the guardian and protector of the parochial poor, to the delegated representative of the people in the imperial parliament; and argued, with considerable eloquence, the advantages which would result to all classes from the liberal cultivation of knowledge, in civil and political economy, and in the useful arts.

The extensive establishment of the English language over the continent of North America, and our vast colonies, both in Asia and the West, had spread a taste for English literature and scientific enquiries, which it became the peculiar duty of the citizens of this metropolis to cultivate and promote.

It was in London that the brighter gems of British genius had been matured and ushered into light. The pathos and wit of our inimitable Shakespeare breathed forth its delightful effusions in this city: that brilliant star of philosophy—the immortal Newton, whose penetrating mind fathomed the utmost bounds of the visible creation, pursued his studies in this metropolis, and here discovered and developed the dark mysterious ways and laws of nature. The sublime Milton conceived and produced his celestial themes in a humble dwelling, which stood upon the very spot of ground on which this theatre has now been raised.

In a stream of eloquence which our limits will not allow us to pursue, the learned orator proceeded to enforce his arguments in behalf of the cultivation of Literature and Science in this metropolis, and particularly among the members of this institution, and concluded amidst the enthusiastic applause and admiration of the delighted audience.

In the course of the evening several interesting and highly gratifying speeches were delivered by Dr. Birkbeck, and other gentlemen, members and friends of the institution; after which, the secretary announced the order of lectures to be delivered, commencing on Wednesday, 20th instant.

On the Armature of Load-stones.

The natural magnet or load-stone, has from time immemorial, justly attracted the attention of mankind, on account of the very remarkable and useful properties of which it is found naturally possessed. Strange, however, as at first view it may appear, no attempt has been made to ascertain by graphic delineation, the real arrangement of the poles in a mass of ferruginous matter. The importance of this will, however, be apparent in the armature of natural magnets, as the most singular anomalies have been found to arise from the employment of different load-stones, after the process of *armature* had been resorted to.

Kircher, in his book *De Magnete*, says, that the best way to arm a load-stone is to bore a hole through it, in which is to be placed a steel rod of a moderate length. This, he asserts, will take up more weight at the end than the stone itself, and Gassendis prescribes the same mode of arming. This is, certainly, a very valuable arrangement, but its intended object may be entirely marred by the accidental arrangement of its poles. This, however, will be better understood by reference to Fig. 2, Plate 3, in which it will be found, that the polar arrangement of the entire mass differs very materially from what we might have expected from the application of the compass to one point*.

* The ingenious author of the above chart originally prepared its elaborate arrangement for the use of a learned Society, of which he is a member.

The various layers of which the magnetic mass is composed, have frequently a distinct series of poles, which tend to neutralize or destroy each other; so that, it will frequently be found, that a cubical block of several pounds will raise less iron than a fragment from the same stone, of less than half the weight.

If then, we wish to arm a load-stone in the most perfect way, it will be necessary for us to make a series of observations, such as are shewn in the engraved chart, prior to commencing the process of armature, and then by properly arranging the steel plates, the best possible result may be obtained.

Fall of Rain.

SIX inches of rain fell at Geneva in the short space of three hours, on May 20th, 1827. From September 23d to 27th, there fell at Montpellier, fifteen inches eight lines of rain. In forty-eight hours, from the 24th to the 26th of that month, eleven inches ten lines of rain fell at M. Berard's manufactory, near Montpellier. The fall of rain at Joyeusse, (department de l'Ardrêche) was, according to the registers of M. Tardy de la Brossy, most extraordinary. The maximum of rain collected in any one day, for twenty-three years, was, on the 9th of August, 1807, as much as nine inches three lines: but on the 9th of October, 1827, there fell twenty-nine inches three lines of rain, in the space of twenty-two hours. Eleven days of that month, according to the same registers, gave thirty-six inches of water, or about double the quantity which fell at Paris during the whole year.—*Annales de Chimie.*

Luminous Appearance of the Sea.

MR. Finlayson, in his "Mission to Siam and Hue," has

the following paragraph relative to the luminous appearance of the sea near Prince of Wales's Island :—

"Nothing is more singular in these seas than their phosphorescent appearance by night; the ocean shewing like a vast lake of liquid fire, melted sulphur, or phosphorus. In many bays, such as the harbour at Prince of Wales Island, the bodies which emit this singular light exist in such vast quantity, that a boat may readily be distinguished at the distance of several miles by the brilliant light, resembling that of a torch, proceeding from the water, agitated by her bow and oars. We have seen the sea rendered of a green colour and slimy appearance by day, so that it might have been mistaken for the green vegetable matter common on stagnant pools. We have taken up a quantity of this green-coloured water, and, by keeping it till night, have ascertained, that the green colour by day, and the phosphorescent appearance by night, were occasioned by the same substance.

"The causes of this luminous appearance in the sea are doubtless various in different parts of the ocean. We know that fish, when dead, afford a similar light; and experiments have shewn, that dead fish immersed in sea water, after a time, afford it also. The spawn of fishes is said to afford it, and putefraction is considered as a very common cause of this appearance. In the present instance, it appeared unequivocally to proceed from innumerable granular gelatinous bodies, about the size of a pin's head. These, when taken upon the hand moved about with great agility for a second or two, when they ceased to be luminous and remained immoveable."

Red Snow.

Captain Parry, in his "Narrative of an attempt to reach the North Pole, in 1827," states, that on the 2d of

August, they met with red snow, of which the following account is given.

"In the course of this day's journey, we met with a quantity of snow, tinged, to the depth of several inches, with some red colouring matter, of which a portion was preserved in a bottle for future examination. This circumstance recalled to our recollection our having frequently before, in the course of this journey, remarked, that the loaded sledges, in passing over hard snow, left upon it a light rose-coloured tint, which, at the time, we attributed to the colouring matter being pressed out of the birch of which they were made; to day, however, we observed that the runners of the boats, and even our own footsteps, exhibited the same appearance; and, on watching it more narrowly afterwards, we found the same effect to be produced, in a greater or less degree, by heavy pressure, on almost all the ice over which we passed, though a magnifying glass could detect nothing to give it this tinge. The colour of the red snow which we bottled, and which only occurred on two or three spots, appeared somewhat different from this, being rather of a salmon than of a rose colour, but both were so striking as to be the subject of common remark.

Effect of the Aurora Borealis on the Magnetic Needle.

At a late sitting of the Académie des Sciences, M. Arago made several communications and statements, tending to confirm his opinions, (which have been controverted by Dr. Brewster and others), with respect to the effect on the magnetic needle produced by the Aurora Borealis, even when it is not visible on the spot, from not having passed the horizon.

Meteorological Prognostication observed in the Shetland Isles.

Mr. Scott, Professor at the Sandhurst College, states, that he has witnessed the following effect. It has been the custom to place drinking glasses in an inverted position upon a shelf in a cupboard on the ground floor of Belmont House. These glasses frequently produce spontaneous sounds similar to those which would be occasioned either by tapping them lightly with a pen-knife, or by raising them a little, and letting them fall upon the shelf. These sounds always indicated wind, and whenever they occurred, the boats and vessels were immediately placed in security. No indication was given of the quarter from which the wind would come, but the strength of the sound was always proportionate to that of the tempest. The latter came sooner or later, but generally several hours after the sounds. Mr. Scott states, that there was no sensible motion either in the glasses or their support, at the time when the sound was strongest, and he thinks that the cause of the phenomena may be electricity.—*Annales des Chimie.*

Fall of Aërolites.

It is stated in the St. Petersburgh Gazette, that a shower of aërolites fell near Belostok, on October the 8th, between nine and ten o'clock in the morning. The inhabitants were alarmed by an extraordinary noise which proceeded from a large black cloud that hung over their heads, and which continued for three, (some say six), minutes, resembling a running fire of musquetry. The noise, which was heard by several persons at the distance of more than ten miles, was succeeded immediately by a

shower of stones, of which only four were picked up; the largest weighed four pounds, the smallest three quarters.

New Method of Preserving Crystals of Salts.

MR. DEUCHAR in a communication to the Wernerian Natural History Society, mentions, that crystals of efflorescent and deliquescent salts can be preserved from decay, if the air in the jars in which they are kept is impregnated with oil of turpentine. This is effected by pouring a very small quantity of the oil over the bottom of the jar.

General Science.

Royal Medal adjudged to Sir H. Davey.—The Royal Society of London has adjudged one of the royal medals to Sir H. Davy, for his method of protecting the copper of ships' bottoms.

Medal adjudged to M. Struve.—The Royal Society has adjudged a gold medal to M. Struve of Dorpat, for his observations on double und multiple stars.

Copley Medal adjudged to Dr. Prout.—The Royal Society has adjudged a Copley medal to Dr. Prout, for his mode of analysis of animal and vegetable substances.

Copley Medal adjudged to Lieut. Foster.—The Royal Society has adjudged a Copley medal to Lieut. Foster, for his observations on the magnetical needle, and the pendulum at Port Bowen.

Medal adjudged to Sir Thomas Brisbane.—The Astronomical society has adjudged one of their medals to Sir Thomas Brisbane, for his valuable astronomical observations made in New South Wales.

Keith Medal adjudged to Dr. Brewster.—The Royal Society of London has adjudged the Keith medal to Dr. Brewster, for his discovery of two new fluids in the cavities of certain minerals.

Diorama.

This unique display of the scenic art attracts daily crowded assemblages of the fashionable town. The subjects which have been recently opened for exhibition, are a portion of the ruined Cloister of St. Wandrille's Abbey in Normandy, and the entrance of the Village of Unterseen in Switzerland.

The talent displayed by the painter, in the former of the subjects, is, in our opinion, equal to any of his previous productions, that, however, does not appear to be the prevalent feeling; probably, because the extremes of light and shade are not so strongly depicted; a considerable portion of the scene being exposed to the unobstructed light of day. There are, however, parts of the picture which certainly have never been surpassed, if equalled. We allude particularly to the trembling of the leaves, pendant from, and clinging to, the mouldering ruins, which seem gently agitated by the passing breeze; and the sudden opening of a gate, creaking upon its rusty hinges, exhibits the warmth of sunshine upon the landscape without, in beautiful contrast to the chilly gloom of the venerable cloister within.

The village scene is beyond dispute one of the happiest productions of the scenic art; one may stand before the picture, and fancy the street extended in the view to be real, so extremely accurate is the perspective, and so strikingly natural the effects of light and shade, from the brightest sunshine in the foreground, diminishing gradually into the dimness of distance, where mountains rear their snow-topped heads. If there is any drawback upon the excellence of the picture, it is the want of boldness and colour in the sky, but certainly the artist merits the highest praise.

French Patents

DELIVERED IN OCTOBER, NOVEMBER AND DECEMBER, 1827.

To Souffrant, Barthelmi, mechanic, of Paris, for a pump, he calls a French pump to supersede steam engines. 15 years.

— Fastemain, Pierre Nicolas, of Sononches, for a machine to cut the corn in the field. 15 years.

— Bourrouse de Laffore, Joseph Bonaventure, of Agent, for a process to learn to read in a short time, he calls "Statilégie," 10 years.

— Bn. Cagniard de Latour, of Paris, for a process to apply the several sorts of "Lava," to purposes as yet unknown. 15 years.

— Capdeville, Charles Antoine, of Lugos, for improving cast iron by employing raw heath root. 10 years.

— Spiller, Joel and Crespel, Delisse, Louis Francois, Xavier Joseph, of Paris, for employing steam in the manufacture of beet-root sugar. 5 years.

— Cluesman, Jean Baptiste, of Paris, for a piano wherein the pins and dampers are different from other pianos. 5 years.

— Lepine, Jaques Nicolas, of Paris, for a portable gas apparatus. 10 years.

— Segundo of Paris, for improved horse bits, &c. 10 years.

— Petite pierre, Jean Henri, of Paris, for a metotachygraphique mould box to cast characters for music. 15 years.

— Aschermann and Perrin, Paris, for a cutting machine to shave the hair from hides for hat manufacturing. 10 years.

— Louis Junior, Francois, of Nimes, for improvements in the looms, "a la jaquart." 10 years.

— Lebarbey Pierre, of Paris, for a means to prevent and suspend ruptures. 10 years.

— Muirial Etienne, of Lyon, for woven stuffs imitating engravings, typographies. 10 years.

— Conrad, Philippe Henri, et Adhemar, Louis Joseph, of Paris, for a process to manufacture bricks. 10 years.

— Steininger, Francois, of Paris, for a mechanism principally applicable to the bass-viol. 5 years.

— Didot fils, Firmin, of Paris, for a process he calls lithotypographique to print with moveable letters. 5 years.

— Lorget, Albert Louis, of Paris, for a process to manufacture paper imitating enamel. 5 years.

— Leistenshneider, Ferdinand, of Poncey, for manufacturing paste board. 5 years.

— Bourquin, Abraham Henri and Company, of Lyon, for a mechanical weaver's shuttle. 5 years.

— Mallic Charles, et Memo, Fleuri, of Lyon, for a mechanical loom batt in weaving ribbands, &c. 5 years.

— Berthet, Claude and Cacheux, Victor, of Paris, for a clock escapement. 5 years.

— Beauvais, Francois, of Lyon, for a metallic composition he calls "argyroide" susceptible to the polish of steel. 5 years.

To Saint Maurice Cabang, of Paris, for a copying press, or secretary. 5 years.
— Rodier fils, Denis, of Nimes, for processes to give various workmanship to silk, wool, and cotton. 15 years.
— Mialle Simon, of Paris, for a method to teach to read in a few lessons. 15 years.
— Dumoutier, Bon Pierre, of Pantin, for manufacturing hydraulic lime. 15 years.
— Montagny, Jean Pierre, of Paris, for manufacturing buttons of all colours and dimensions imitating silk buttons. 5 years.
— Lepine, of Paris, for a horse collar and saddle. 5 years.
— Boutain, Charles Toussaint, of Paris, for double spectacles, he calls "binocle a tirage simultane." 5 years.
— Bridier, Royer of Sedan, for a malt-mill. 10 years.
— Croisat, Ferdinand, of Paris, for a hair brush. 5 years.
— Guilbout, Alexander and Bondot, Vincent, of Paris, for a system of machinery for roving and drawing silk, cotton, &c. 5 years.
—Gaulofret fils, Joseph, of Marseille, for a process to revive animal coal. 10 years.
— Arizolli, Barthelemi, Francois, of Paris, for cast iron chimneys. 15 years.
— Comte de Rochelines, Jean Baptiste Richard, and Fabricius Leonard, of Douai, for a mechanism to prevent the overthrowing of Coaches. 5 years.
— Bernardiere, Achille, for manufacturing fine baskets, &c. with whale bone. 5 years.
— Richard, Jean Jaques, of Paris, for manufacturing divers articles in cast iron instead of cast steel. 5 years.
— Collain, Jean Pierre, Francois, of Sabrian, for a serpentine chimney and fire-place in union with the boiler. 15 years.
— Irving of Paris, for apylying the atmospheric pressure and vacuum to produce a rotatory motion. 10 years.
— Boulet Jacques, of Paris, for a process to strengthen the carded and combed wool, &c. 15 years.
— Canson freres, of Annonay, for a process to glue the paper in the paste tub. 10 years.
— Simon Nicolas of Saint Die, for a portable kitchen-garden. 5 years.
— Prudel Pierre, of Carcassone, for a cloth shearing machine. 10 years.
— Siau Barthelemi Gaulofret fils, and Boffe freres Melchior Francois et Jean Baptiste, of Marseille, for a process to manuture glue from gelatine. 5 years.
— Becker, Henri Guillaume, of Strasbourg, for a new high pressure loco-motive steam engine. 10 years.
— Clement Desormes, of Paris, for a new construction of rooms destined to the manufacturing of sulphurique acide. 15 years.
— Migeon of Morvillars, for a machine to form the heads of wood-screws by heat. 10 years.

To Delacoux, of Paris, for an improved harp. 10 years.
— Choel nec Marie, Marquerite Leger, of Paris, for a method to cut out the edges of bobbin net. 5 years.
— Adam Jacques Francois, of Paris, for a moveable binding of books. 10 years.
— Bertaux Alexandre Murie, of Paris, for means to prevent the oversetting of carriages. 10 years.
— Thinat of Nantes, for a new high pressure steam engine. 10 years.
— Lamothe Jean, of Montreal, to make Bagliamy's distilling apparatus portable. 10 years.
— Strylosh William, of Lyon, for a process of manufacturing tallow candles imitating wax candles. 5 years.
— Beauduin Vramenne Servais Joseph, of Sedan, for a machine to prepare any material destined to the selvage of cloth. 10 years.
— Perkins Jacob, citoyen des Etats, Unis, for improvements in steam engines. 15 years.
— Becasse Pierre Victor, of Paris, for a carriage trigger with a moveable leaver. 5 years.
— Bernhard Antoine, of Berlin, for an apparatus to raise water or any other fluid only by the pressure of the atmosphere. 15 years.
— Galy-Cazalat, of Nancy, for an acrostatic lamp, and candlestick. 10 years.
— Chamboredon Louis Cesar, of Alais, for a mechanical power, he calls "conservateur des forces." 5 years.
— Wright Lemuel Wellman, of London, for a new improved crane. 15 years.
— Gourlier, Adrien Jean Baptiste, of Paris, for a boot iron, he calls "fer mobile cylindrique." 5 years.
— Petit pierre Jean Henri, for a machine he calls typomelographique for engraving music. 5 years.
— Boche and Aubin, for a gunpowder box measuring the charge. 5 years.
— Rolle Frederic et Schivilque Jean Baptiste, for a scale to weigh carriages. 10 years.
— Niogret Guillaume, of Paris, for a method of carrying passengers and goods without the power of horses, steam, &c. 10 years.
— Capy of Paris, for a coffee-pot. 5 years.
— Chamblant, Marie Nicolas Joseph, of Paris, for a new mechanical principle to convert the direct into a rotatory motion. 15 years.
— Vicomte de Barres du Molard Jean Scipion Henri, of Paris, for a new systeme of bridges with expanded bearings. 15 years.
— Duclose Philippe Ignace, of Paris, for a girdle he calls "menouheene" to the use of females. 5 years.

To Bostock, James Bethune of London, for a system of machinery to manufacture metallic screws, commonly called, "wood screws." 15 years.

— Duguet fils, Antoine Nicolas, of Paris, for a machine he calls "pétrin méchanique" for making bread. 15 years.

— Batilliat pierre of Macon, for a chymical substance to substitute for linen rags in the manufacture of paper. 10 years.

— Gervais of Paris, for a process to improve the manufacturing of wines, brandy, and other spirits. 10 years.

— Gibon Jacques Louis, of Paris, for new unalterable picture frames. 5 years.

— Poupon Claude, of Nuits, for a wine press. 5 years.

— Nuellens of Paris, for elastic matrasses, &c. 15 years.

— Arnett Thomas, of London, for an improved floating bed. 10 years.

— Perkins Jacob, citoyen des Etats, Unis, for additional improvement in steam engines. 15 years.

— Moitenier Antoine Prosper Marchand Auguste et Maseline Jaques Francois, for a cloth shearing machine, called "velocifor. 5 years.

— Fusz Pierre, of Iaming, for a mechanical coach trigger, to stop the wheels of carriages. 10 years.

— De lapotte Pierre and Berthier, Jerome, for a process to manufacture metal thimbles. 5 years.

— Aschermann et Perrin, of Paris, for a blowing machine to cleanse the materials employed in the manufacturing of Hats. 10 years.

— Capelain, Jean Baptiste Claude, of Rouen, for a cloth shearing machine, he calls "a mouvement alternatiff. 5 years.

New Patents Sealed in 1828.

To Jane Bentley Lowrey, of Exeter, Straw Hat Manufacturer, for certain improvements in the manufactory of hats and bonnets.—Sealed, 25th March, six months for inrollment.

To Edward Cowper, of Clapham Road Place, in the parish of St. Mary, Lambeth, in the county of Surrey, gent. for certain improvements in cutting paper.—26th March, six months.

To Ferdinand de Fourville, of Piccadilly, in the county of Middlesex, Merchant, for certain improvements in Filtering Apparatus.—26th March, six months.

To Thomas Lawes, of the Strand, in the county of Middlesex, Lace Manufacturer, for improved thread, to be used in the manufacture of the article commonly called bobbin net lace.—29th March, six months.

To Henry Marriott, of Fleet Street, in the City of London, Ironmonger, and Augustus Siebe, of Princes Street Leicester Square, in the county of Middlesex, Machinists, for improvements in hydraulic machines.—29th March, six months.

To Peter Taylor, of Hollinwood, in the county of Lancaster, Flax Dresser, being one of the people called Quakers, for certain improvements in machinery, for hackling, dressing, or combing flax, hemp, tow, and other fibrous materials. 29th March, six months.

To John Davis, of Leman Street, Goodman's Fields, in the county of Middlesex, Sugar Refiner, for an improvement in boiling or evaporating solutions of sugar and other liquids.—29th March, six months.

To Charles Harsleben, of New Ormond Street, in the County of Middlesex, Esq. for certain improvements in machinery to be used in Navigation, chiefly applicable to the propelling of Ships, and other floating bodies, and which improvements are also applicable to other purposes. —3d April, six months.

To Lemuel Wellman Wright, of Mansfield Street, Borough Road, in the county of Surrey, Engineer, for improvements in the construction of wheel carriages, and in the machinery employed for propelling, drawing, or moving wheel carriages.—15th April, six months.

To John Gottlieb Ulrich, of Cornhill, in the city of London, Chronometer Maker, for improvements in Chronometers.—19th April, six months.

Meteorological Journal kept at the London Institution.

DATE.	TIME.	BAROM.	Thermometer. IN.	Thermometer. OUT.	WIND.	REMARKS.
MARCH 1	9	30·35	56	45·0	N. E.	Cloudy
	3	30·20	58	48·2	N. E.	Ditto
3	9	29·95	51	42·2	W. S. W.	Ditto
	3	29·95	53	45·6	W.	Ditto
4	9	30·00	52	43·2	N. W.	Cloudy, rn in theNight
	3	30·00	53	44·4	N. W.	Fine
5	9	29·90	51	38·4	W.	Ditto
	3	29·95	52	40·2	W. S. W.	Ditto
6	9	30·10	50	36·4	S. W.	Ditto
	3	30·05	51	39·8	S. by W.	Ditto
7	9	30·25	51	35·8	S. W.	Ditto
	3	30·20	53	39·2	S. by W.	Fine, rain in the even.
8	9	30·15	53	45·8	S. W.	Cloudy
	3	30·20	54	49·6	S. W.	Ditto
10	9	30·30	54	49·8	W.	Fine
	3	30·30	56	53·4	W. S W.	Ditto
11	9	30·30	53	45·8	S. W.	Ditto
	3	30·30	56	49·6	S. by W.	Ditto
12	9	30·15	55	47·4	S. W.	Ditto
	3	30·15	57	49·8	W. S. W.	Ditto
13	9	30·25	56	51·2	S. W.	Ditto
	3	30·35	60	57·8	S. by W.	Ditto
14	9	30·30	55	54·2	S. W.	Ditto
	3	30·30	58	58·4	S. W.	Ditto
15	9	30.45	54	53·2	S. by W.	Ditto
	3	30·40	58	56·8	W. S. W.	Ditto
17	9	30·30	56	51·8	S. W.	Cloudy, rain in Night
	3	30·30	58	54·2	S. W.	Cloudy
18	9	30·30	56	49·8	N. W.	Fine
	3	30·20	57	50·4	N. W.	High Wind
19	9	29·50	55	46·2	W.	Ditto
	3	29,50	56	48·6	N. W.	Fine
20	9	29·40	54	45·4	S. W.	Cloudy
	3	29·40	56	47·2	S. W.	Rain
21	9	29·05	53	46·2	S.	Cloudy
	3	29.00	54	47·4	S.	Th. Ligt. Hail & Rain
22	9	29·40	52	42·4	W. S. W.	Fine
	3	29·40	54	45·8	S. W.	Rain
24	9	29·75	51	40·8	N	Fine
	3	29·75	52	43·2	N.	Hail, Rain
25	9	29 90	52	41·2	S.	Fine
		29·90	53	43·4	S. W.	Rain, Hail, &c.

In our last Meteorological Journal, the following *Errata* should be corrected.

January 5, *for* 22·70 *read* 29·70.
12, *for* 21·85 *read* 29·85.
23, *for* 33·35 *read* 30·35.
February 19, *for* 22·40 *read* 29·40.

Meteorological Journal kept at the London Institution.

DATE.	TIME.	BAROM.	Thermometer. IN.	Thermometer. OUT.	WIND.	REMARKS.
MARCH 26	9	29·95	51	36·8	N E.	Fine
	3	29·90	53	41·4	N. by E.	Ditto
27	9	29·55	51	44·8	S. E.	Rain
	3	29·50	52	48·8	S. by E.	Fine
28	9	29·55	52	43·4	N. E.	Rain
	3	29·60	54	46·2	N. by E.	Cloudy
29	9	29·65	50	42·2	N.	Fine
	3	29·65	52	44·6	N. by E.	Ditto
31	9	30·35	51	39·8	N. E.	Ditto
	3	30·35	52	44·6	N. by E.	Ditto
AP. 1	9	30·35	48	39·8	N. E.	Ditto
	3	30·20	50	44·6	N. E.	Ditto
2	9	30·10	51	44·2	N. by E.	Ditto
	3	30·15	52	43·4	N. E.	Ditto
3	9	30·15	58	44·2	N. by W.	Ditto
	3	30·10	54	46·4	N.	Cloudy
4	9	30·10	53	42·4	N. E.	Ditto
	3	30·05	54	45·8	N. E.	Ditto
5	9	30·00	50	42·4	N. W.	Ditto
	3	30·05	51	45 8	N. W.	Ditto
7	9	29·50	52	44·6	E.—S. E.	Rain
	3	29·45	54	46·2	S. E.	Cloudy
8	9	29·40	51	43·4	S. E.	Ditto
	3	29·45	53	46·2	S. W.	Ditto
9	9	29·45	52	45·6	S. W.	Ditto
	3	29·45	54	48·2	S. W.	Fine
10	9	29·50	53	44·2	W.	Rain
	3	29·55	54	47·4	W.	Rain, Thunder
11	9	29·85	56	49·8	S. W.	Fine
	3					
12	9	29·70	57	54·2	S. W.	Cloudy
	3	29·70	59	56·4	S. W.	Ditto
14	9	29·85	55	51·2	S. W.	Ditto
	3	29·85	56	53·8	S. by W.	Cloudy, heavy rn. at 5
15	9	29·75	56	52·4	S. W.	Rain
	3	29·70	58	54·2	S W.	Rain, nearly all day
16	9	29·70	57	53·2	S. by W.	Cloudy
	3	29·55	59	54·8	S. W.	Rain
17	9	29·55	56	53·6	S. by W.	Cloudy
	3	29·55	59	55·4	S. W.	Ditto
18	9	29·60	57	52·6	S. W.	Rain
	3	29·60	58	55·8	S. W.	Ditto
19	9	29·60	58	51·8	S. W.	Ditto
	3	29·65	59	54·2	S. W.	Ditto
21	9	29·75	53	48·4	S. W.	Ditto
	3	29·75	55	52·4	S. W.	Cloudy,rn.in the even.
22	9	29·70	54	44·6	W.—S. W.	Ditto
	3	29·75	56	48·2	S. W.	Rain, Rain at 5.
23	9	29·85	53	50·4	S. W.	Cloudy
	3	29·85	56	52·6	S. W.	Fine
24	9	29·85	55	52·6	N. W.	Ditto
	3	29·90	59	57·8	W.—S. W.	Cloudy
25	9	29·95	56	54·2	S. W.	Cloudy,rn in morning.
	3	29·85	57	57·4	S. W.	Cloudy.

CELESTIAL PHENOMENA FOR MAY, 1828.

D.	H.	M.	S.	
1	0	0	0	☉ before the clock 3′ 5″
4	9	0	0	☿ in conj. with ε in Pisces.
5	0	0	0	☉ before the clock 3′ 31″
5	5	40	0	☾ in conj. with β in Capri.
6	0	0	0	♅ Stationary.
6	5	32	0	☾ in □ last quarter.
6	14	26	54	♃'s 1st Satt. will immerge.
8	8	55	30	♃'s 1st Satt. will immerge.
9	14	0	0	♄ in conj. with δ in Gemini.
10	0	0	0	☉ before the clock 3′ 51″
10	12	0	0	☾ in conj. with ε in Pisces.
10	17	0	0	☾ in conj. with ζ in Pisces.
12	9	0	0	☾ in conj. with ☿. Long. 9° 40′ in Aries. ☾ lat. 1° 17′ S. ☿ lat. 1° 17′ S. dif. lat. 0.
12	15	0	0	♀ in conj. with ε in Gemini.
13	9	50	0	Ecliptic Conj. or ● New Moon
14	8	0	0	☽ in conj. with 1 δ in Taurus.
14	8	0	0	☽ in conj. with 2 δ in Taurus.
14	10	0	0	☽ in conj. with ε in Taurus.
15	0	0	0	☉ before the clock 3′ 56″
15	10	49	48	♃'s 1st Satt. will immerge.
19	19	0	0	☽ in conj. with 1 α in Can.
19	20	0	0	☽ in conj. with 2 α in Can.
20	0	0	0	☉ before the clock 3′ 46″
20	15	34	0	☉ enters Gemini.
20	18	0	0	☽ in conj. with ο in Leo.
21	4	0	0	☽ in conj. with π in Leo.
21	11	11	0	☽ in □ first quarter.
22	12	0	0	☿ in conj. A in Taurus.
22	12	44	12	♃'s 1st satt will immerge.
23	6	0	0	☽ in conj. with υ in Leo.
24	17	0	0	☿ in conj. with 2 κ in Leo.
25	0	0	0	☉ before the clock 3′ 24″
26	11	0	0	☽ in conj. with λ in Virgo.
26	15	0	0	☽ in conj. with ♃. Long. 6½° in Libra. ☾ lat. 59′ 38″ N. Jup's lat. 1° 20 N. diff. lat. 20′ 22″
27	1	0	0	☽ in conj. with 2 α in Libra.
27	4	0	0	♀ in conj. with κ in Gemini.
27	19	0	0	☽ in conj. with 4 ξ in Libra.
28	3	0	0	☽ in conj. with ϑ in Libra.
28	20	17	0	Ecliptic opposition, or ○ Full Moon.
30	0	0	0	♂ Stationary near ψ in Sagitt
30	0	0	0	☉ before the clock 2′ 50″

☽ The Waxing Moon.— ☾ The Waning Moon.

Rotherhithe J. LEWTHWAITE.

METEOROLOGICAL JOURNAL, FOR MARCH AND APRIL 1828.

1828.	Thermo.		Barometer.		Rain in inches.	1828.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low.	High.	Low.			Hig.	Low.	High.	Low	
MAR.						APRIL					
26	49	24	29,82	29,73		11	54	36	29,70	29,66	,01
27	52	32	29,46	29,43	,025	12	56	45	29,60	29,56	,05
28	46	36	29,66	29,43	,025	13	58	47	29,53	29,46	,075
29	47	36	29,80	29,75	,075	14	56	38	29,73	29,66	
30	50	31	30,06	29,86	,025	15	57	41	29,72	29,58	,1
31	52	[illegible]	30,26	30,16		16	54	42	29,56	29,31	,2
APR. 1	50	25	30,22	30,10	,025	17	55	43	29,36	29,34	,125
2	48	32	30,00	29,96		18	50	45	29,36	29,30	,425
3	46	31	30,03	29,96		19	52	42	29,61	29,46	,525
4	47	31	29,89	29,86		20	50	43	29,77	29,76	,175
5	52	28	29,76	29,66		21	47	42	29,62	29,61	
6	48	35	29,53	29,52	,325	22	47	36	29,60	29,59	,05
7	48	35	29,40	29,29	,05	23	52	39	29,76	29,72	,2
8	49	35	29,36	29,20	,225	24	60	45	29,76	29,66	,05
9	45	39	29,39	29,22		25	58	46	29,83	29,66	
10	55	38	29,50	29,36	,05						

LOWER EDMONTON. CHARLES H. ADAMS

Lat. 51° 37′ 32″ N. Long. 3′ 51″ W. of Greenwich.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. III,

[SECOND SERIES.]

Original Communications.

ART. XI.—IMPROVED MODE OF SOFTENING AND HARDENING CAST STEEL DIES FOR STAMPING, COINING, &c. BY JOHN OLDHAM, ESQ. OF THE BANK OF IRELAND.

To the Editors of the London Journal of Arts, &c.

GENTLEMEN.—The subject of hardening dies, and other steel tools, being one of very considerable importance connected with the mechanical arts, I am desirous of communicating, through the medium of your valuable Journal, the modes which I have adopted to effect that object, and the results of my experience as connected with that branch of the arts.

Annexed you have a rough sketch of my apparatus for the treatment of cast steel, (see Plate VI.) In this process I have gone through a great variety of experiments, as recommended by the most eminent practitioners in Great Britain, together with what occurred to myself from time to time, in order to remove the casualities con-

stantly occurring in this hitherto uncertain process. First by the accident of burning it in the softening process, which often impoverishes the steel beyond recovery, and secondly, in scaling its surface by cracking, and even splitting the tools, and also in warping or twisting the materials, which in the operation of hardening sometimes renders them altogether useless.

I have found from repeated trials, the following principle of treatment never subjects me to any of those unpleasant disappointments.—Mr. Perkins recommends wrought iron filings, and I think this material fully as good, if not better than any other I have tried for softening Cast Steel, especially if it be made from soft Swedish iron purposely, so as to be perfectly free from all foreign matter.

The die or any other tool is to be covered about one inch thick in a sheet iron box, and this again put into a cast iron box one inch thick, with a thickness of sand covering all about one inch on every side as well as the top and bottom; the whole is then to be covered with a lay over lid and to remain from one to six (and in some cases twelve) hours, in proportion to the size of the tools and the degree of softness they are to be made to, not of course to be removed from the fire until all be quite cold. The fire is to be as strong as possible without being excited by draft or blast All this precaution I deem necessary to prevent burning the material which, as stated, nothing can recover that I know of.

When the die or other tool is to be hardened, I make carbon of new leather cuttings in the usual way in a close retort and immerse it while hot therein, taking care to keep it insulated in the sheet iron box covered with carbon to the depth of an inch: this box I put closely luted into a vertical muffle which I cover with a loose lid laid on, enveloping all in a clean coke fire [which never should be ex-

cited beyond the colour of sealing wax or red wafers] for such a length of time as the tool or die to be hardened may require.

On taking it out to be dipped for this purpose, I do not in the first instance use water from the consideration that the hot steel in decomposing the water extricates its oxygen and other gas, and which the former has such an affinity for as to destroy its surface; besides, water is a very rapid conducter of heat and too suddenly cools and contracts the outside of the tool, and the superior expansive power of the heat contained within the tool soon overpowers the cooling effect of the water, and consequently splits or warps the die or tool. Therefore I use olive oil, or which is still better napstha previously heated to 200 degrees. For either of those materials give out their carbon in the process of decomposition by heat, and of which they contain from 70 to 80 per cent. each. This material is more congenial to the character of steel and most essential to the hardening of it. Scarcely any gas is liberated and not being such a rapid conductor of heat as water alone, the steel will not, I find, crack or warp. In this, however, I only keep it immersed until the ebullition ceases occasioned by the immersion of the red hot steel therein, when I instantly take it out and dip it in an artificial spring of cold water where it is kept until completely cold.

By this mode of treatment the tools come out perfectly clean and as hard as it is possible to make cast steel perfectly free from cracks or flaws, and is never twisted or warped in the least.

Large tools or dies are very readily brought down in temper, if required, by being suspended in the muffle while red hot until brought to a straw colour; but, for any thing particular, especially for small tools, I prefer the same oil heated to 400 degrees and the tools left therein till cold.

I do, believe myself warranted in recommending the foregoing mode of treatment of cast steel tools or dies as being free from the vexatious disappointments that so often perplex and embarrass the artisan, to say nothing of the serious expence of loosing certain tools, and dies, upon which very great labour and expence has been bestowed.

Plate VI. figs 1 and 2, exhibit sections of my steel furnace *c*, *c*, are the sides and front made of cast metal. *d*, *d*, a jacket to prevent annoyance from heat, the vacant space between which and the furnace may be filled with some non-conducting material. *e*, *e*, are in holes in the sides. *i*, *i*, *i*, feet standing upon a basement made of blocks of fire stone or Stourbridge bricks, with a circular dish formed cast metal plate on the top thereof, with a hole in the middle for grate bars. *k*, *k*,—*m*, ,*m* is the ash pit fitted with a close door for cutting off the draft of air that way when necessary. The use of the dish is to form an ash lute to prevent air from having access that way. *f*, is the vertical muffle in both views, *g*, the inside cast iron box for receiving the die or tool; supported on *h*, the tripod—*o*, *o*, *o*, *o*, a wrought iron cradle composed of four arms for muffles to be suspended in, and hooked on the top edge of the furnace mouth.—*a*, *a*, sheet iron hood with door *b*, and chimney, *n*, *n*, &c.

By this plan of furnace, I can always command an uniform fire of equal temperature throughout; I think it may be occasionally essential, on particular occasions, to employ a damper in the chimney, which therefore may be added, though I never use one, opening the door *b*, I have found, answers quite as well.

Fig. 3, is the artificial spring,—*r*, an open vessel lined with lead, with waste pipe *t*. *p*, a double copper vessel standing therein, with inside bottom *q*, finely perforated

with small holes; *s*, a pipe of sufficient bore, leading to an elevated reservoir, with cock and handle *u*, therein; *z*, a small cock, to empty the fluid from the inside of *p*, into *r*, when required; the pipe *s*, is constantly open all the time that the steel is cooling.

These are the principle features of my process, and which having found more effective than any other mode that I know of, I have communicated to you for the benefit of your readers and the public in general, and remain,

Bank of Ireland, Your's, &c.
May 9th, 1828. JOHN OLDHAM.

ART. XII.—MR. SHUTTLEWORTH'S PRINTING PRESS.

WE have been favoured by the ingenious inventor of this press, with the following additional details tending to illustrate the construction and use of his improved printing press, represented in Plate I, fig. 3, and described at page 11 of the present vol.

The Machine consists of three principal parts, the bed, the traversing frame, and the gearing, (for references see page 12.) The bed consists of an oblong table, on which is laid the inking slab, and the type, which latter is placed between the rollers.

The traversing frame is of considerable importance, as it contains the inking cylinder and the press roller, by the alternating motion of which, the impressions are taken off.

The gearing consists of a rack fixed to the traversing-frame, to which a reciprocating motion is communicated by the large wheel, which is formed of two planes screwed together, of different diameters, the teeth on the periphery of the largest of which impels the rack to the left, and those on the smaller of which, causing a small pinion in-

terposed between it and the rack, to revolve when the teeth on the larger plane are out of gear, forces it back. It must also be observed, that during the periods of the several planes being out of gear with the rack, owing to the deficiency of teeth in different portions of the wheel, the traversing frame is at rest.

Let us now suppose the traversing frame to be pushed back to the extreme right, and the projecting teeth of the larger plane to be put in gear by turning the handle, by the motion of the rack to the left, as the wheel revolves, the press roller and cylinders will be drawn over the type, when these teeth being out of gear, the teeth of the smaller plane will, by communicating a rotatory motion to the pinion, (behind the right upright,) move back the rack sufficiently to allow the inking cylinders again to pass over the type, whilst the press roller is still to the left of the chase ; the vacuum space caused by the defalcation of the teeth now allows the frame to remain stationary, whilst the conducting drum and types being put n motion, (regulated by the occasional omission of teeth in the connected gearing,) draws in the paper over the type, sufficiently high to avoid coming in contact, till the drum stops, when the second row of teeth coming into use, forces the press roller over the chase, and the cylinders over the inking slab. By the second omission in the teeth, the frame rests whilst the drum again in motion carries out the paper, which, by the elasticity of the tapes, rises a little above the chase, after the roller leaves it, and delivers it out.

It will be seen, that at every revolution of the wheel, one side of a sheet is perfected, and the speed of the machine requiring, as near as can be calculated, something less than a moderate man's power, alone regulates the number of impressions.

Art. XIII.—On the Influence of the Moon on the Weather.

To the Editors of the London Journal of Arts, &c.

Gentlemen.—I need hardly inform you, that the weather, as denoting the state or disposition of the atmosphere, in regard to heat and cold, drought and moisture, fog, wind, rain, hail, snow, and other changes, is a sort of knowledge which is of vast utility to the public at large. Many persons, in this country, are surprised at the degree of perfection to which the ancients attained in this science; but it ought to be borne in mind, that the study of the weather in the countries occupied by them, such as Egypt, Greece, Italy, and the continent of Europe, is a very different field for observation from an island situated like England. If must be apparent, that it is easy to foretell weather in countries where months pass away without rain or clouds, and where for some weeks together, at stated periods, there are as certainly seasons of rain or snow. It may be asserted, with truth, that there is a greater variety of weather in London in one week, than in Rome, Moscow, or Petersburgh, in three months.

The influence of the moon on the weather has, in all ages, been believed by the generality of mankind, the same opinion was embraced by the ancient philosophers; and several of the most eminent of later times, have thought the opinion not unworthy of notice. Although the moon only acts, (as far at least, as we can ascertain,) on the waters of the ocean, by producing tides, it is, nevertheless highly probable, according to the observations of Lambert, Toaldo, and Cotte, that in consequence of the lunar influence, great variations do take place in the atmosphere and consequently in the weather. The

following principles will shew the grounds and reasons for their embracing the received notions on this interesting topic.

There are ten situations in the moon's orbit, when she must particularly exert her influence on the atmosphere, and when, consequently, changes of the weather must readily take place. These are: 1, the new moon; 2, the full moon, when she exerts her influence in conjunction with, or in opposition to the sun; 3, and 4, the quadratures, or those aspects of the moon when she is 90°. distant from the sun, or when she is in the middle point of her orbit, between the points of conjunction and opposition, namely, in the first and third quarters; 5, the perigee; and 6, the apogee, or those points of the moon's orbit, in which she is at the least and greatest distance from the earth; 7, and 8, the two passages of the moon over the equator, of the first, which Toaldo calls the moon's ascending, and the other, the descending equinox, or the two lunistices, as De Lande terms them; 9, the boreal lunistice, when the moon approaches, as near as she can, in each lunation, or period between one new moon and another to our zenith; 10, the austral lunistice, when she is at the greatest distance from our zenith, for the action of the moon varies greatly according to her obliquity.

With these ten points, Toaldo compared a table of 48 years observation, the result is, that the probabilities that the weather will change at a certain period of the moon, are in the following proportions. New moon, 6 to 1. First quarter, 5 to 2. Full moon, 5 to 2. Last quarter, 5 to 4. Perigee, 7 to 1. Apogee, 4 to 1. Ascending equinox, 13 to 4. Northern lunistice, 11 to 4. Descending equinox, 11 to 4. Southern lunistice, 3 to 1.

That the new moon will bring with it a change of weather, is, in the doctrine of chances, as 6 to 1. Each

situation of the moon alters that state of the atmosphere which has been occasioned by the preceding one; and it seldom happens that any change in the weather takes place without a change in the lunar situations. These situations are combined on account of the inequality of their revolutions, and the greatest effect is produced by the union of the syzigics, or the conjunction and opposition of a planet with the sun, with the apsides or points in the orbits of planets, in which they are at the greatest and least distance from the sun or earth. The proportions of their powers to produce variations are as follow. New moon coinciding with the perigee, 33 to 1. Ditto with the apogee, 7 to 1. Full moon coinciding with the perigee, 10 to 1. Ditto with the apogee, 8 to 1. The combination of these situations generally occasions storms and tempests, and this perturbing power will always have the greater effect, the nearer these combined situations are to the moon's passage over the equator, particularly in the months of March and September. At the new and full moons in these months, and even at the solstices, especially the winter solstice, the atmosphere assumes a certain character, by which it is distinguished for three and sometimes six months. The new moons which produce no change in the weather, are those which happen at a distance from the apsides. As it is perfectly true that each situation of the moon alters that state of the atmosphere which has been produced by another, it is, however observed, that many situations of the moon are favourable to good, and others to bad weather.

The situations of the moon favourable to bad weather, are the perigee, new and full moon, passage of the equator, and the northern lunistice. Those belonging to the former, are the apogee, quadratures, and the southern lunistice. Changes of the weather seldom take place on

the very days of the moon's situations, but either precede or follow them. It has been found by observation, that the changes effected by the lunar situations in the six winter months precede, and in the six summer months follow them.

Besides the lunar situations to which the above observations refer, attention must be paid also to the fourth day before new and full moon, which days are called *octants*. At these times the weather is inclined to change, and it may be easily seen, that this will follow at the next lunar situation. Virgil calls this fourth day, a very sure prophet. If on that day, the horns of the moon are clear and well defined, good weather may be expected; but if they are dull, and not clearly marked on the edges, it is a sign that bad weather will ensue. When the weather remains unchanged on the 4th, 5th, and 6th days of the moon, we may conjecture that it will continue so till full moon, even sometimes till the next new moon, and in that case, the lunar situations have only a very weak effect.

The following table constructed upon a philosophical consideration of the attraction of the sun and moon in their several positions respecting the earth, drawn up by the late celebrated Sir William Herschel, and confirmed by the experience of many years actual observation, will, without trouble, suggest to the observer what kind of weather will most probably follow the moon's entrance into any one of her quarters, and that, so near the truth, that in very few instances, it will be found to fail.

NEW OR FULL MOON.	SUMMER.	WINTER.
If it be new or full Moon, or the Moon enters into the first or last quarters at 12 at noon or between the hours of	Very Rainy.	Snow or Rain.
2 and 4 - - -	Changeable.	Fair and Mild.
4 and 6 - - -	Fair.	Fair.
6 and 8 - - -	Fair, if Wind North, West; Rain, if South, or South West.	Fair and Frosty if wind North or North East; Rain or Snow if South or West.
8 and 10 - - -	Ditto.	Ditto.
10 and midnight	Fair.	Fair and Frosty.
midnight and 2 - - -	Ditto.	Hard Frost, unless wind South west.
2 and 4 - - -	Cold, with frequent Showr	Snow and Stormy.
4 and 6 -	Rain.	Ditto.
6 and 8 - -	Wind and Rain.	Stormy.
8 and 10 - - -	Changeable.	Cold, Rain if Wind North, Snow if East.
10 and 12 at noon	Frequent Showers.	Cold with High Wind.

Hence, the nearer the time of the moon's entrance at full, and change, and quarters, is to midnight, (that is within two hours before and after midnight,) the more fair the weather is in the summer; but the nearer to noon, the less fair. Also the moon's entrance at full, change, and quarters, during six of the afternoon hours, viz., from 4 to 10, may be followed by fair weather, but this is mostly dependant on the wind. The same entrance during all the hours after midnight, except the two first, is unfavourable to fair weather, the like nearly may be observed in the winter.

HACKNEY, MAY, 1st, 1828. Yours, &c. J. D.

ART. XIV.—ON THE SILK WORM.

To the Editors of the London Journal of Arts, &c.

GENTLEMEN.—Having some years ago been led in the course of business to reside for some time in the south of

France, and being intimately connected with silk reeling, my attention was attracted to several particulars in that branch of French national industry; among others, the following has always appeared to me to be well worthy the attention of men of Science. Every one who, whether in England or abroad, has ever bestowed the slightest attention on the silk worm either as a matter of curiosity or as a matter of business, must be well aware, that some of the cacoons are white and some yellow, but every one is not perhaps aware that yellow gum silk, reeled from the yellow cacoons, is strongly impregnated with an odour resembling that of violets, at the same time that white gum silk reeled from white cacoons, is perfectly free from odour of any description, I therefore beg leave to propose for solution the following question. "What is the reason of yellow gum silk being impregnated with an odour of violets, whereas white gum silk is free from that or any other odour?" Having proposed the question, I add the following particulars for the information of those who may be disposed to attempt the solution of it. 1st, the fact above stated is invariably found to exist in the south of France, even though the worms forming the different coloured cacoons may have sprung from the same parent stork, and even though they have been fed from the same tree; 2nd, the yellow gum silk is always specifically lighter than the white; and, 3rd, so strong is the odour of violets with which the yellow gum silk is impregnated, that a few pounds of yellow being confined for two or three days with several cwts. of white, shall suffice to impart a strong odour of violets to the whole mass, let both be exposed to the air, the white soon loses its acquired perfume, but the yellow retains it, and will continue to do so for ten or twelve months. In what I have stated above, I should wish to be understood, as confining myself strictly to

French silk, and that in the raw state before it has been submitted to the operation of throwing, whether the same peculiarity exists in the Greek, Chinese, and Indian silks, I have had no opportunities of judging, nor can I, not being perfectly acquainted with their system of reeling, form an opinion whether in that operation there may not be some extraneous matter employed, which might, even if the peculiarity above named did really exist, prevent its being noticed.

Should you deem the above question worthy a place in your Journal, I shall feel obliged by your insertion of it.

I remain, Gentlemen, Your obedient Servant,

London, May 7th, 1828. W. B. HONYMAN.

ART. XV.—A REPORT ON A PROCESS FOR SEASONING TIMBER; INVENTED BY JOHN STEPHEN LANGTON, ESQ*.

Mr. Langton having discovered a new method of seasoning timber, consisting in the removal of the greater part of the atmospheric pressure, and the application of artificial heat, by which the time necessary to season green timber, and render it fit for use, is only about twice as many weeks as the ordinary process requires years: he requests my opinion, first, on the influence this mode of seasoning may be expected to have on the wood; and secondly, on the practicability and advantages of the process on the large scale.

The ordinary mode of seasoning timber consists in evaporating the fluid matter, (called sap), by the natural

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* We readily avail ourselves of Mr. Langton's permission to publish the annexed report, prefacing that our own opinion fully coincides with that expressed by Mr. Tredgold for the specification of Mr. Langton's patent, see Vol. XIV, page 17, of the first series of this Journal.

warmth of the atmosphere, with the precaution of screening the timber both from the direct action of the sun and wind, otherwise it cracks and receives much injury.

But seasoning, by the natural warmth of the atmosphere, proceeds slowly and irregularly, and much loss by decay takes place, unless the operation be conducted under the protection of a roof, to exclude rain and snow. Seasoning under cover is still a slow, though an expensive process, for at least three years should elapse from the time of felling the tree to that of its being used in such framing as is wanted in naval architecture, hence a stock of timber, equivalent to four years consumption, must be kept on hand, and three years consumption must be either under cover, or suffering still greater loss by exposure to the wet.

In the new process, the power of an air-pump is added, to draw the sap out of the interior of the wood, and the tendency of the fluid to the outside being thus increased, a higher temperature than that of the atmosphere can be applied, with less risk of causing the timber to split; consequently, the process may be completed in less time, and a few trials will show the best relation between the time and heat for the different kinds of wood.

Having briefly stated the process, I can with more clearness show the strong grounds on which my opinion is formed.

First, then, as to effect on the durability and strength of the wood. In the new process, as in the ordinary one, the sap is removed by evaporation; no solvent of the woody fibre is therefore introduced in either case, while the sap itself, being a fluid readily affected by temperature and other agents, it seems obvious that the sooner it is wholly removed from the wood, the better, provided the woody fibre contracts and solidifies without injury. That

this may be done, is evident, from the specimens from which the sap has been extracted; they exceed the usual density of specimens equally dry, and have lost about the same weight in drying that is lost in the usual method, with a somewhat greater degree of shrinkage. The sap which is extracted is a nearly clear liquid, having a sweetish taste, with a very peculiar flavour, and a musty and disagreeable smell. The latter seems to proceed from a light, flocculent kind of matter, floating in the sap, affording the strongest evidence, that the sooner such matter is removed from timber, the better; and as it appears that the whole of this matter is removed by completing the process, I am of opinion the new mode of seasoning will render timber more durable than the common one, and it does not appear to be in any degree deteriorated in strength.

Secondly, the method is, undoubtedly, practicable on the large scale, and at an expense not exceeding ten shillings per load, with the advantage of setting free, at least half the capital required by the common method; the advantage of rendering the living tree available either for defence, convenience, or common use, in a few weeks after being felled, and in a state in which it may be trusted with safety; while, by the usual method, five years is not more than is necessary to be equally free of risk from shrinkage and decay. The usual practice is to use timber partially seasoned, in consequence of which the sap has to evaporate, and the wood shrinks, the joints open and the carpenter's skill in framing is rendered nugatory; for, as timbers shrink, frames change their form, and lose their strength, and ships and houses alike afford evidence of the fact, particularly ships sent out to warm climates.

It only remains to add, that, by the new method, the whole of the natural sap is extracted at once from the tree; it is known, by very simple means, when the whole has been extracted; the process requires only eight or ten weeks; it is more economical, and locks up less capital than the common method; and it contributes to the durability and soundness of timber framing.

THOMAS TREDGOLD.

Recent Patents.

To WILLIAM CHURCH, *of Birmingham, in the County of Warwick, Esq. for his Invention of certain Improvements in Printing.*—[Sealed 18th October, 1826.]

THE subjects embraced under this patent are intended as additions to the very ingenious machinery for printing, invented by Doctor Church some years back, particularly that machine for which a patent was granted in February 1824, and described in the tenth volume of the first Series of our Journal, page 169, and plate VIII.

The present improvements consist first in the introduction of a traversing sheet of calico or other fit material, to be employed in place of what is technically called the set off sheet with certain apparatus for the purpose of shifting it and preventing the effects of setting off in reiteration or perfecting the impression of the types upon a sheet of paper on both sides. Secondly, in a mode of sliding the bank or board upon which the sheets of paper are piled after printing, for the purpose of discharging the sheet from the taking off fingers. Thirdly, the construction and

method of opening and closing the taking off fingers. And fourthly, the introduction of moveable bearers for supporting the ends of the inking rollers as they pass over the inequalities of the types set in the form.

Plate VI. Fig. 4, is a plan or horizontal view of the top of the platen and the bank shewing the situations of most of the improved parts, which are further exhibited in the following detached figures and partial views of the machine. Fig. 5, represents the platen, table, and form, as seen edgewise with the parts connected to the set-off sheet rollers—*a*, *a*, are two rollers affixed to revolving shafts *b*, *b*, to these rollers the two ends of a long piece of calico or other suitable material are attached, and the portion of calico extending from one roller to the other being passed under the platen is tightly distended, so as to produce an even surface extending over the form of types, which is to act as a set-off sheet.

In order to move this set-off sheet progressively forward, after every impression given, a catch takes hold of a ratchet wheel affixed on the shaft *b*, and draws the roller round a portion of a revolution in the manner about to be described; *c*, *c*, are the ratchet wheels affixed to the shafts *b*, *b*, one of which is to be acted upon by the catch *d*, after every impression.

As it is intended to work the set-off sheet backward and forward, that is to draw it off one roller, and wind it upon the other alternately, there is a contrivance by which when one of the catch *d*, is made to act upon its ratchet wheel, the other catch is withdrawn, consequently the sheet will be moved towards either end of the machine, according to which of the catches are placed in operation, and this setting of the catch is done by a simple hand adjustment. But as it is not wished to move the set-off sheet in printing the first side of the paper,

the parts are so contrived that both the catches may be thrown out of action, and the set-off sheet allowed to remain stationary.

The mechanism when placed as shewn in fig. 5, is in this inactive state detached, but in fig. 6, which represents the operative parts, one of the catches is exhibited as taking into the teeth of the ratchet on the right hand; *e*, *e*, is a bent bar connected at each end to a tumbler *f*; and this bar is held fast in its situation by one of the notches near its centre, bearing on an angular stud *g*. A claw at each end of this bent bar supports and guides the arms of the catches *d*, *d*, and according to which of the notches of the bar *e*, is placed upon the bearing *g*, so will the catches be lowered into or raised out of the ratchets as shewn.

When it is intended that the set-off sheet shall traverse towards the right hand; then the bar *e*, must be shifted towards the right hand, and the left hand notch be brought into the angular stud *g*, fixed on the platen. This adjustment of the bent bar will place the right hand tumbler *f* in an enclined position as at Fig. 6, and bring down the catch *d*, into the right-hand ratchet wheel *c*, as shewn in that figure. The left-hand extremity of the spring bar will by this movement bring its tumbler into an erect position, which holds up the left-hand catch out of its ratchet wheel.

In order that the set-off sheet may be kept tightly distended under the platen while the right-hand catch and ratchet wheel are drawing it, the left-hand roller *a*, from which the sheet is now delivering, is held by a circular friction clip *t*, embracing a wheel affixed to the end of the roller. The chaps of this circular clip cross each other and are forced asunder by a double pallet, which by expanding the chaps brings the circular clip into close contact with the periphery of the wheel, and the friction ensuing necessarily impedes the rotation of the roller. When the

set-off sheet is to be drawn the reverse way, then the bent bar *e*, must be shifted to the left-hand, the right-hand notch resting upon the angular stud *g*. The left-hand catch will now fall into the teeth of the left-hand ratchet wheel *c*; the right-hand catch being by the same movement raised up from the right-hand ratchet wheel, and the chaps of the circular clip on the right being now extended by the action of the pallet, the clip embraces and holds the right-hand plain wheel and its roller in the same way and for a similar purpose to that described in explaining the contrary movement of the set-off sheet; the left-hand clip at the same time releasing its hold, allows the left-hand roller to be drawn round by its catch acting in the teeth of its ratchet wheel.

In order to work this mechanism which draws the set-off sheet, sliding racks are introduced, shewn at *l*: which racks are connected to the rising and falling table *m*, *m*. The manner of moving this table and its form upwards and downwards being fully described in the specification of the former patent referred to above, is not explained in the present specification.

At the sides and under part of the table there are ears or lugs *n*, from which studs extend, and the lower parts of the rack bars *l*, being forked, take hold of these studs and the racks are consequently moved up and down by the rising and falling of the table. The sliding rack bars pass through mortices in the platen *o*, which racks take into toothed wheels *p*. These toothed wheels are intended to perform rather more than half a revolution upon their axles, and to receive a reciprocating motion from the racks as they ascend or descend.

A bent lever *q*, is attached by a joint to the angular stud *g*, (which is its fulcrum) and passing up through a slot in the bent bar *e*, is connected to the reciprocating wheel *p*, the junction of which acts as a crank.

By the connection of the parts last described, it will be seen that as the wheel *p*, moves round, the lever *q*, will be moved also; and this being attached to the catch arms at their junction, causes the catches to be sliden to and fro, and the ratchet wheel which is in connection, and its roller to be made to turn a portion of a revolution at every stroke.

Thus either of the catches being set in the manner described the rising and falling of the table will actuate the mechanism so as to cause the set-off sheet to be progressively drawn from off one roller on to the other roller, and by this means to shift the surface of the set-off sheet a little distance after every impression is given; and, when the entire roll or length of calico of which the set-off sheet is formed has been passed in one direction, then the bent bar *e*, is to be shifted as explained above, and the length of calico worked back again in a similar manner; and, in order to prevent as much as possible the same parts of the sheet coming again upon the same parts of the form of types at every change; the rollers *a*, *a*, are to be slidden a short distance in a lateral direction upon their axles or shafts *b*, *b*.

After bringing up the sheet of printed paper by means of fingers on to the bank or board, *w*, *w*, Fig. 4, upon which the sheets are to be piled as described in the former specification; and, having opened the fingers, it is desirable to slide the pile a short distance for the purpose of drawing the edge of the sheet from the fingers. To effect this object, there is a click *v*, attached to the back of the plain wheel upon the barrel of the reciprocating wheel *p*, which click drops into a notch in the periphery of a loose wheel that slides round upon the axle of the reciprocating wheel. In the side of this loose wheel, a crank pin *x*, is fixed, which acts between two guide pieces *y*, *y*, attached to the side of the bank frame *w*, *w*; and, hence by the reciprocating action of the wheel

p, the click drives round the loose wheel half a revolution at every stroke, and causes the crank pin *x*, to move the bank or piling table to and fro, immediately after each sheet of paper has been laid upon the pile and the fingers opened.

It is to be observed that a similar contrivance is placed on each side of the bank which is worked as above said, by the rising and falling of the table.

The improved mode of constructing and of opening and closing, the taking off fingers will be seen by reference to the auxiliary detached figures 7 and 8. In the former specification, it will be seen that the taking off fingers are attached to bars which are conducted by endless chains passed over pulley wheels; in the present instance, the fingers are conducted by endless chains in a similar way, but attached to cylindrical rods *a*, one within the other; the lower finger is secured to the outer cylindrical rod, and the upper finger to the inner rod, and passing through slots with a spring coring them open. When the fingers are brought between the table and the platen, the pressure acting against the chaps of the locking piece *b*, forces them together, and a spring catch *c* passing through a slot, locks them securely and confines the edge of the sheet of paper between the fingers.

When the fingers have brought the sheet of paper on to the pile, they are opened by a leaf *d*, striking against a trigger *e*, which forces the catch back and allows the springs within to throw the fingers open. This part of the mechanism is worked by two small studs *f*, *f*, on the side of the rack bar *l*, which as the rack bar rises and falls in the operation above described; strikes the lever *g*, up and down, and moves the rod which carries the leaf *d*, and causes the leaf to vibrate and to strike against the trigger *e*, at the time that the fingers are to be opened.

The bearers which support the ends of the inking rollers

shewn at *t*, *t*, in Fig. 5, hang upon springs and are made to rise and fall. When the table *m*, with the form is up giving the impression, the bearers are below it, as shewn in Fig. 5, free from the sheet of paper; but as the table *m*, descends previously to the inking rollers passing over the type; the pieces *v*, *v*, affixed to the frame of the machine, catch the ends of the bearers and keep them up level with the surface of the type. On the rising of the table, again they descend into the situation shewn. The patentee says, "I have described this improvement as particularly designed to be adapted to the printing press as set forth in my specification above alluded to; but, I wish, also, to be understood as claiming the above contrivance when adapted to any other construction of printing press: and, particularly the shifting calico or other suitable material employed as a set-off sheet, which may be adapted to a variety of printing machines, and may be formed and made to move in many ways which convenience and other circumstances will dictate."—[*Inrolled April* 1827.]

To John Guy *and* Jacob Harrison, *both of the Parish of Workington, in the County of Cumberland, Straw Hat Manufacturers, for their invention of an improved method of preparing Straw and Grass to be used in the manufacture of Hats and Bonnets.*—[Sealed 14th July, 1826.]

The subject of this patent purports to be an improved method of drying and preparing straw and grass for making ladies' hats and bonnets.

The straw is to be gathered soon after the corn has come to the ear, and long before it is in a state of maturity, that is in the latter part of the spring, or beginning of summer. The straws may be cut off near the ground, or drawn out of the ground with the roots. About one hundred and fifty straws are to be tied up in a bundle,

and these bundles are to be laid upon a grass field, and spread out in the form of a fan, where they must be allowed to remain for two or three days and nights, occasionally turning them over: after this they are to be tied up in larger bundles, and suspended under sheds, upon lines or on hooks, for the purpose of drying up the sap.

From these places of shelter the bundles of straw are to be removed into the sunshine, whenever the weather is fine, and frequently turned over, but great care must be taken that they are always protected from rain, or other moisture, as the colour would become injured by damp. If by these means the straws are not brought to a beautiful gold colour, it may be desirable to expose them to the sun in glazed houses, until the gold-like appearance has been perfectly attained. The straw thus prepared may now be laid by for use, or for the market, in warehouses or stacks, observing that it be carefully protected from damp. It may be necessary to say, that wheat-straw is preferred for the purposes of making the hats and bonnets, but other straws will sometimes answer nearly as well.

When grass is the material intended to be made into bonnets in imitation of leghorn, the stems of grass are to be gathered when its seeds first make their appearance, and are to be prepared and dried in the manner above described.—[*Inrolled January*, 1827.]

To Edward Bayliffe, *of Kendal, in the County of Westmoreland, Worsted Spinner, (being one of the people called Quakers) for his invention of certain improvements in the Machinery used for the operations of drawing, roving, and spinning of sheep and lambs' wool.*—[Sealed 14th July, 1826.]

The principal object of these improvements, is to deprive the wool of its elasticity, in order to enable its fibres

to be drawn out to a considerable extent in straight lengths, and afterwards twisted or spun into worsted. The mode of doing this, is, first,—by the introduction into the drawing machine of a rapidly-revolving wheel, in contact with the front drawing roller, by means of which the fibres of wool are subject to considerable friction against the periphery of the said wheel, and their elasticity and curl is destroyed by the heat: secondly, by the employment of a moveable regulating roller, by which the extent of surface on the periphery of the wheel that the lengths of wool is to act upon, may be increased or diminished at pleasure, and consequently the effect regulated or tempered, as the quality of the wool may require: thirdly,—the employment of steam in a rotatory drum, or hollow wheel, in place of the wheel first described, for the purpose of heating the wool, in the process of drawing in order to facilitate the operation of straightening the fibres.

These objects may be effected in several ways, that is, the machinery may be variously constructed, and still embrace the principles proposed. Plate VI, fig. 9, shews one mode:—*a*, is the friction wheel; *b*, the front drawing roller, placed in the drawing frame in the same way as usual; the larger wheel *a*, constituting the lower roller of the pair of front drawing rollers; *c*, and *d*, are the pair of back drawing rollers, which are actuated by gear connected to the front rollers, as in the ordinary construction of drawing machines, the front rollers moving very considerably faster than the back rollers, and consequently drawing or extending the fibres of the sliver of wool as it passes through between them; *e*, is a guide roller, bearing upon the periphery of the large wheel; *f*, is a tension roller, which presses the fibres of wool down upon the wheel *a*.

Now, supposing the back rollers *c*, and *d*, to be turned

with a given velocity, and the front roller *b*, to be driven much faster, the effect would be, that the fibres of wool constituting the sliver passing through the machine, would be considerably extended between *b*, and *d*, which is precisely the effect accomplished in the ordinary drawing frame; but the wheel *a*, introduced into the machine in place of the lower front drawing roller, being made to revolve much faster than *b*, the sliver of wool extended over the upper part of its periphery, from *b*, to the tension roller *f*, will be subjected to very considerable friction from the contact, and consequently the natural curl of the wool will be taken out, and its elasticity destroyed, which will enable the wool to proceed in a connected roving down to the spindle or flyer *h*, where it becomes twisted or spun into a worsted thread.

In order to increase or diminish the extent to which the fibres of wool are spread over the periphery of the wheel *a*, a regulating roller is adapted to the machine, as shewn at *g*, in place of the tension roller *f*. This regulating roller *g*, is mounted by its pivots, in bearings on the circular arms *h*, shewn by dots. These circular arms turn loosely upon the axle of the wheel *a*, and are raised or depressed by a rack and a winch, not shewn in the figure, the rack taking into teeth on the periphery of the circular arms. It will hence be perceived, that by raising the circular arms, the roller *g*, will be carried backward, and the fibres of wool pressed upon the periphery of the wheel to a greater extent. On the contrary, the depression of the circular arms will draw the roller *g*, forward, and cause the wool to be acted upon by a smaller portion of the periphery of the wheel *a*, and consequently subject it to less friction.

When it is desired to employ steam for the purpose of heating the wool, the wheel *a*, is formed as a hollow drum,

and steam from a boiler in any convenient situation is conveyed through the hollow axle to the interior of the drum, which becoming heated by that means communicates heat also to the wool, and thereby destroys its curl and elasticity.

These proposed improvements, as before said, may be variously adapted to effect the intended object, therefore, the entire construction of a drawing and roving machine need not be represented, as the improvements are, first, the introduction of a wheel for the purpose of subjecting the wool to considerable friction, in order to destroy its elasticity. Second, the employment of a moveable tension roller, mounted upon segments, by which a greater or less portion of the wool may be brought in contact with the friction wheel: and third, the introduction of steam into a hollow wheel or drum, for the purpose of heating the wool, and thereby taking out the curl, and destroying the elasticity, so as to enable it to be spun into worsted. —[*Inrolled, [illegible] January,* 1827.]

To Theodore Jones, *of Coleman Street, in the City of London, Accountant, for his having found out and invented improvements on wheels for carriages.*—[Sealed 11th October, 1826.]

This invention is a mode of constructing wheels for carriages entirely of iron, and appears to be merely applicable to such wheels as are applied to waggons and carts for the conveyance of very heavy goods. The felly, or periphery of the wheels is made of cast iron, with conical holes on the outside, contracting towards the centre, through which the spokes, made of iron rods, are to be passed, and secured in the box, or nave, near the centre

of the wheel by nuts screwed on to the reverse ends of the rods, by which means they are drawn tight.

Plate VII, fig. 1, represents one of the wheels in perspective. Fig. 2, is a side view of the same, and fig. 3, a sectional view of the box or nave, the outer cap being removed. The felly of the wheel *a, a,* made of any required breadth, has a rib extending round it on the inside, principally for the purpose of giving strength, and in which any number of conical sockets are to be made according to the number of spokes which it may be thought necessary to employ.

The rods intended to form the spokes, as before said, are passed through the conical holes of the sockets from the outer part of the felly, and being made slightly conical at their outer extremities, necessarily tighten as they advance towards the centre.

The nave *b, b,* consists of two boxes, as seen in the perspective figure, into which the spokes are alternately passed, so as to stand at angles to each other, for the purpose of bracing the whole, and giving additional strength in a lateral direction.

By the representation of the box or nave of the wheel, shewn at fig. 3, it will be seen, that the inner extremities of the spokes have screw threads cut round them, upon which nuts are fitted; and the outer ends of the spokes being made fast in the felly by the conical sockets, as above described, the screwing of the nuts in the nave fix them firmly, and complete the wheel; which, unlike wheels of the ordinary construction, derive their support, not from the resistance of the lower spokes alone, but from the tension of the upper spokes also, and the outer cap of the nave being put on, the mode of fixing the spokes is altogether concealed.

A tire is to be placed round the periphery of the felly, by means of screws, or any other contrivances, and which

may be renewed when worn. It will be perceived that the form of the wheel is cylindrical, and that it runs round in a perpendicular position, which is very much better than conical, or dished wheels, commonly applied to waggons. —[*Inrolled, April,* 1827.]

To COUNT ADOLPHE EUGINE DE ROSEN, *of Princes Street, Cavendish Square, in the County of Middlesex, in consequence of a communication made to him by a certain Foreigner residing abroad, for an invention of a new Engine for communicating power, to answer the purpose of a Steam Engine.*—[Sealed 1st August, 1826.]

THE subject of this patent is an apparatus for heating air which is intended to be applied to the working of a piston by its expansive power in the same way as steam engines are commonly actuated, and also for the purpose of heating water and converting it into steam.

Plate VII, Fig. 4, is a section of the apparatus, *a*, is a cylindrical vessel to be employed as a blowing machine, in which a piston *b*, is worked by any convenient means. This vessel is furnished with two valves *c*, *c*, opening inwards for the purpose of admitting air into the vessel. *d*, *d*, *d*, is a pipe or tube leading from the vessel *a*, both above and below the piston, the apertures of which pipe are furnished with valves opening outwards at *e*, *e*. The other extremity of the pipe *d*, communicates with the furnace *f*, *f*, below the fire grate.

The furnace is a cylindrical vessel surrounded with a jacket to prevent the radiation of heat: its lower part being contracted at *g*, which is the ash pit and is closed air tight at bottom. A worm pipe *h*, *h*, coiled round the interior of the furnace is, consequently, enveloped in the flames.

The fuel is supplied through a box *i*, at top, which has two sliders for the purpose of delivering the coal in small quantities.

If now the piston *b*, of the blowing machine be worked up and down, the air will be admitted into the vessel *a*, alternately through one of the valves *c*, *c*—that is, it will pass in by that valve from which the piston is receding, and at the same time the volume of air at the end of the vessel towards which the piston is approaching will be expelled through one of the valves *e*, *e* and the pipe *d*, and be discharged from that pipe as a blast into the lower part of the furnace below the fire grate.

The upper extremity of the worm pipe *h*, has a trumpet mouth opening near the middle of the furnace, and the blast of wind forced up through the fire in the manner described; enters this pipe at top in a heated state, and proceeding through the worm, becomes still more elevated in temperature till it is discharged at the reverse extremity of the pipe out of the furnace.

The air thus heated may be employed as an elastic material for driving a piston in a cylinder in the same manner as in the ordinary construction of steam engines, or instead of being applied to the working of a piston, may be carried into a closed box as in the figure, and there made to generate steam.

The box *k*, *k*, may be made of cast iron or any other fit material, with a series of shelves extending nearly across it, having at its upper part a small chamber *l*, containing water which is supplied through the pipe *m*, from the reser voir *n*, *n*, placed at the top of the furnace. The small chamber *l*, being thus filled, a pump *o*, is employed to inject the water in small quantities into the closed box *k*, when it descends into the upper shelf and runs down from thence on to the lower shelves in succession ; at the same time the

heated air from the pipe *h*, carried into the closed box, converts the water into steam which passes off by the pipe *p*, at bottom, for the purpose of working a steam engine, or for any other use that it may be required.—[*Inrolled February*, 1827.]

To JOHN WILLIAMS, *Ironmonger and Ship's Hearth Manufacturer, and* JOHN DOYLE, *merchant, both of the Commercial Road, in the County of Middlesex, for their invention of an Apparatus and Process for separating Salt from Sea Water, and thereby rendering it fresh and fit for use.*---[Sealed 4th August 1826.]

This apparatus is designed to be used on ship board, and consists principally of a cylindrical vessel filled with sand through which the salt water is passed, and in its passage the salt is taken up by the sand, and the water delivered after filtering in a fresh and pure state.

Plate VII, Fig. 5, shews the apparatus principally in section *a*, *a*, is a cylindrical vessel of wood or any other suitable material which is lined on the inside with cement as far as the filterer extends; *b*, is the bottom of the filterer formed with a grating which is supported by the frame of a stool; *c*, is a pipe extending from the under part of a cask, *d*, containing the salt water, and which pipe opens to the lower part of the vessel *a*, *a*, below the filterer. Over the grating *b*, there are placed several thicknesses of woven horse-hair, or a quantity of wool, and above this the vessel is filled with sand. On the top of the sand there is a plate *e*, like a piston pressing upon the sand and keeping it compact; the plate being held down by a screw *f*.

The salt water thus delivered from the cask *d*, by the

pipe *c*, fills the lower part of the vessel *a*, and by the superincumbent pressure of the column descending from the cask, the water is forced upwards through the mass of sand, and runs off at the cock *g*, in a purified state.

There are man holes *h*, *h*, for the purpose of getting access to the interior when it is required to remove the sand and other matters, and the internal surface of the filterer is rendered rough in order to prevent the water from sliding up the sides of the vessel, instead of passing through the sand.—[*Inrolled February*, 1827.]

The principles here described though slightly varied in form, constituted the subject of a patent granted to A. H. Chambers, E. Chambers, and C. Jearrard Esquires, for a new filtering apparatus. (see our Eleventh Volume, page 245.)—Editor.

To Thomas John Knowlys, *of Trinity College, Oxford*, Esq. *and* William Duesbury, *of Bousal, in the County of Derby, Colour Manufacturer, for their having invented certain improvements in Tanning.*—[Sealed 1st August, 1826.]

This improved mode of tanning, consists, in suspending the hides in a close vessel, from the interior of which the air is to be exhausted by means of an air-pump, and when the vacuum within is sufficiently perfect, the tanning liquor is admitted, which immediately penetrates into the pores of the hide, occupying the place from whence the air has been extracted. By these means the operation of tanning will be greatly facilitated.

Plate VII, fig. 6 is a section of the apparatus, *a*, *a*, is a vessel of cast iron, or other fit material, which is closed by a cap or cover, *b*, placed over the man hole, and is rendered perfectly air-tight at the joint; *c*, is a pipe and

cock, communicating with an air pump, and *d*, is a similar pipe and cock, leading from the reservoir of tanning liquor.

The hides to be tanned are introduced into the vessel at the man-hole, and are suspended by hooks at the upper corners, with weights at bottom to keep the skin extended. As many of these hides as may be required to be tanned, are in this way placed within the vessel *a*, and when the lid is tightly fixed on, the air is to be extracted from the interior by means of an air-pump connected to the pipe *c*.

When a sufficient exhaustion has been effected within the vessel, the cock of *c*, is to be closed, and that of *d*, opened, and the tanning liquor introduced; after which the air-pump may be again worked to draw all the air from the pores of the skins, and to prevent ebullition, a quantity of oil is to be placed upon the surface of the tanning liquor.

The tanning liquor is to be first used in a weak state, and its strength increased daily, until the process is complete. A pump and tube *e*, is to be employed for drawing off the spent tan liquor.---[*Inrolled, February,* 1827.]

The subject of this patent is an example of the wide range through which a valuable hint may be sometimes usefully extended. In the second volume of our first series, page 36, will be found a communication from John Oldham, Esq. of the Bank of Ireland, on his improved method of sizing, dyeing, and wetting paper, for printing Bank Notes, and other purposes, which process was by placing the bundle of papers in a close vessel, and after exhausting the air from the vessel, and consequently from the pores of the paper, introducing the size dye or water, which instantly penetrated the paper in a more perfect way than had been effected by any other means that had been before resorted to.

The same mode of operating has been subsequently employed

in dyeing, and in some other branches of the arts, with very great success, and is in the patent above, proposed to be applied to tanning. But with what propriety it can now be claimed as a new invention, we do not see; the exclusive right of employing the same principles as a novel process in tanning appears to us to be rather equivocal. EDITOR.

To JOSEPH BROWNE WILKS, *of Tandridge Hall, in the County of Surry, Esq., for his Invention of Improvements in producing Steam for Steam Engines.*—[Sealed 2nd August, 1826.]

THE invention which constitutes the subject of this patent, is the combination of a steam boiler with a coke oven, for the purpose of applying the heat evolved in the process of coking coals to the generating of steam in a boiler. By this contrivance, that heat which in the ordinary mode of performing the operation of coking is dispelled and lost, may be employed with advantage and economy.

No precise form of oven or boiler is set forth in the specification, but it is merely said, that the flue from the oven is to pass horizontally through the middle of the boiler, and then divide itself into two branches, returning in the same manner along the sides of the boiler, and joining again into one flue before it enters the chimney.

The patentee says, "I lay no claim to the exclusive use of coke ovens under steam boilers, for the purpose of generating steam therein, during the process of making coke, but I claim the application of a steam boiler, in the construction of a coke oven, by making the bottom of the boiler form the top of the oven.—[*Inrolled February,* 1827.]

In the Eighth Volume of the first series of our Journal of Arts, page 194, we have given the particulars of the Specification of Mr. De Iongh's Patent, dated February, 1824, for "constructing and placing a coke oven under or contiguous to steam or other boilers, so as to make the heat arising from making coke or other intense combustion in the said oven, subservient to the use of the boiler, instead of fuel, &c." consequently; it will be perceived that the idea of combining a coke oven and steam boiler, has been anticipated by the former, patentee, and we believe been extensively practised with great advantage. But the very nice distinction which has been drawn, (probably by some gentleman learned in the law,) between the present invention and the former, is truly admirable.—" I have," says Mr. de Iongh, " placed a *coke oven under a boiler,*" then, says Mr. Wilks, " I lay no claim to a *coke oven under a boiler,*" but " I claim a boiler placed *over a coke oven.*" EDITOR.

To WILLIAM CLELAND, *of Pentonville, in the County of Middlesex, Gentleman, for his Improvements in Evaporations.*---[Sealed, 24th July, 1826.]

THE principal object of these improvements is to cool liquids, such as brewers' worts, distillers' wash, dyers' liquors, &c.; the mode proposed is, to separate the particles, by causing them to descend in a shower, through which a current of air is to be passed.

The rationale of this process depends upon the principle, that the steam from heated liquors carries off a very considerable quantity of caloric; if, therefore, the particles of the liquor can be so separated as to increase the surface, and consequently the quantity of steam evolved, the cooling process will by that means be facilitated.

The patentee has not exhibited drawings of any precise form of apparatus, but states, that over the boiler, or pan,

containing the hot liquor, he places a vessel intended as a reservoir, into which the hot liquor is to be raised from the boiler, by means of a pump. The bottom of this reservoir is partially perforated with holes, like a colander, extending across the bottom, and about twelve inches wide. Through the colander the hot liquor descends in a shower, and the air having a free passage under the reservoir through the shower, drives off the steam, and cools the liquor.

The steam may be conducted into a chimney, and thence escape into the air, or it may be passed through tubes, and brought under other pans, for the purpose of heating other liquors, by which means a saving of fuel will be effected.

In order to increase the effect, several colanders may be placed one below the other, and the liquor be made to pass through them in successive showers. It is presumed, that the natural current of the air will be sufficient for the accomplishment of the object; but if it should be found necessary a blast of air may be produced, by means of a blowing machine.

Instead of employing cold air at all times, the patentee proposes, under some circumstances, to pass a current of dry heated air from a furnace through the shower of liquor, which air having been rendered extremely dry, is then capable of absorbing the steam or moisture which contained the heat, and this heated air may be mixed with the smoke and other vapours from the furnace, and be conducted in the manner above explained, under other evaporating pans, to heat them.—[*Inrolled, January,* 1827.]

Nearly the same process as that above described formed the leading features of a patent for making vinegar, granted to Mr.

J. Ham, of West Coke, in the County of Somerset, dated 7th October, 1824, in which it was proposed to separate the liquor into drops, that the air might act upon it in its most divided state. The liquor was proposed to be raised from the vat by a pump into a vessel above, and the only difference in the apparatus was, that instead of a colander in the bottom of the vessel, a number of birch twigs were placed upon which the liquor being poured it necessarily fell down in drops like rain into the vessel below, the air cooling it in its progress, and promoting the acidity, (see Vol. X, page 367, of the first series of this Journal.)

To WILLIAM PARSONS, *of our Royal Dock Yard, Portsmouth, Naval Architect, for his having invented certain Improvements in Building Ships or other Vessels, which improvements are calculated to lessen the dangerous effects of internal or external violence.*---[Sealed 24th July 1826.]

THE patentee describes the modes of putting together the ribs of that description of vessels employed for the East India service, and explains the present ineffectual mode of securing them merely by the flooring timber; to obviate which disadvantage, the present improved mode of strengthening vessels is suggested.

The proposed improvement is the introduction of cast iron framings, which are to be applied so as to connect the several ribs and other timbers together, and which are to be placed in every part of the vessel, forming them of course according to the situations to which they are to be applied.

In thus adding to the weight of the ship, the patentee considers that no disadvantages will arise, as the quantity of iron employed will in part supersede the necessity of ballast, and instead of weakening the vessel as ballast would do, it will give it additional strength.

As the iron pieces must be formed to suit the parts to which they are to be applied, no precise figure can be given, but they are to be made with grooves and rebates to fit and take hold of the ribs, and with holes to receive the bolts or other holdfasts.

The patentee says he claims the connecting frames for all purposes to which they may be applied in ship-building.—[*Inrolled January*, 1827.]

Novel Inventions.

Generating and Purifying Gas for Illumination, upon a new Plan.

In the 14th volume of the first series of our Journal, we noticed Mr. Pinkus's improvements relative to the production of gas, by means of a simple apparatus, which is to be adapted to the fire-place of a counting-house, or a kitchen-range, in order to supply illuminating gas, for the use of the house and premises immediately contiguous. This apparatus appears now to have been proved, and found fully to answer the expectations of the patentee; we shall therefore take an early opportunity of laying the plans before our readers, indeed, we only now withhold them at the request of the patentee, the foreign patents, which are in progress, not having been yet completed. The following is a paper presented to us by the inventor.

The superiority, brilliancy, and convenience of Gas Lights, having led to their introduction and use in most parts of the united kingdom, the attention of men of science, and capitalists, has been continually devoted to the formation and perfection of establishments necessary for ensuring extensive supplies of Gas to the public, and adopt-

ing improvements to effect its purity. To attain the latter of these objects, various patents have been obtained, and numerous experiments tried: but hitherto the purest gas distributed, has been, when not in a state of ignition, extremely offensive; and when burnt in close rooms frequently injurious to the health. It is also deserving of particular notice, that notwithstanding the many improvements which have been effected, the numerous establishments which have been founded, and the remarkable extension of the use of gas, the public attention is now directed to the object of obtaining reductions in the price of that indispensable fluid.

The object of the patentee is to form a Domestic Gas Company, to furnish, or rather to enable every householder, and occupier of premises, to supply himself with a cheaper, purer, less obnoxious, and more brilliant gas, than any which has yet been produced; not in the spirit of opposition to the opulent and respectable Companies which have so long been established, but with that aim at fair and honourable competition, which must tend to the advantage of the public.

To prove the convenience and safety of the process, it is only necessary to state, that no additional fire-place or stove will be necessary for generating the gas required, the operation being performed by the combination of a particular apparatus with an ordinary kitchen-range, or other common fire-grate, so connected as not in the slightest degree to interfere with its usual purposes, the superfluous heat being used to effect the object; the gas then passes through a refrigerator and the patent purifier, into the gasometer, which may be placed in the cellar, or other convenient situation. The only attention which this process will require, will be for a short time (not half an hour,) in the morning before the fire is lighted, it being

so safe and regular, as not to need the slightest notice during the day or night; and as the residium constantly returns to the retort, and is consumed, no nauseous remains are left to be disposed of.

The purification of the gas is effected by a new method, the obnoxious odour destroyed, and the gas rendered inoffensive, pure, and brilliant.

Patents have been obtained for the mode and apparatus for generating, and for purifying gas, and very heavy expences incurred in bringing the invention to complete perfection.

The patentee proposes to fix the apparatus on the premises where it may be required, at his own expence, and receive an extra remuneration for the first year only, according to the number of lights wanted; after which he engages that the whole expence per annum, including patent-right, shall not exceed one half the present cost of gas supplied by the leading Companies; but individuals may in all cases have the option of purchasing their right for a fixed sum, rated to the advantage of the purchasers.

It is conceived, that in towns and other places where gas establishments have not yet been formed, inns, manufactories, public works, and premises of various descriptions, the proposed Patent Domestic Gas Company will be able to render an important service, and confer an extensive advantage; and the proprietors beg to assure the public, that no exertion shall be spared to render the invention worthy of the encouragement and support of this great commercial country.

Communications may be addressed to Messrs. Paynter and Hawke, Nos. 178 and 283, Strand, (near Norfolk street), which will receive the earliest possible attention.

Whalebone Cloth.

(FROM THE ALLGEM HANDLUNGS-ZEITUNG.)

M. Schulz, of Prague, has taken out a Patent for the manufacture of a kind of cloth from whalebone. We are informed that the cloth obtained by this process bears a strong resemblance to silk, and is particularly adapted for making cravats, under-waistcoats, ribbons, &c.

New Glazing for Earthen Vessels without Lead.

This glazing consists of four parts of calcined soda and five of white sand, (free from iron,) which are mixed together, and reduced to a very fine powder. This powder, after being put into crucibles made of very compact clay, and previously rubbed with chalk on the inside, is exposed to the strongest heat of a potter's furnace. When taken out, the mass is found melted, and presents the appearance of blown glass; it is afterwards reduced to an impalpable powder, in which state it is fit to be employed in glazing.

This glazing penetrates into the pores of earthen vessels, is susceptible of a beautiful polish, and not liable to be acted upon either by acids or alkalies.

"The above article," (says the Editors of the Bull. des Sciences Technolog.) "which appeared originally in the Allgem Anzeiger, has suggested the idea of many other compositions for glazing, equally free from lead—the following are some of them.

Thirty-two parts of Glass, 16 do. of Borax, and 3 of tartar—prepared in the same manner as the above, except that the borax is calcined separately.

Fifty parts of soda, 90 do. of silex,—cast the silex red-

hot into cold water, then pulverize it, and melt the whole.

Eighty parts of soda, 70 do. of sand, and 10 of white clay—calcine the soda, and afterwards melt it with the other ingredients.

Three parts of calcined soda, and 4 of quartz sand—melted together.

One part of powdered pummice stone, mixed and melted with 1-16th of pulverized oxyde of manganese.

Mixture for Silvering Looking-Glasses, &c. *By* M. LACELOTTI.

Two parts of mercury are to be dissolved with three of lead, and the mixture then poured upon glass which has been previously polished and heated. This composition is found to adhere to the glass with great firmness, and to cast a very pure reflection. Care must be taken to separate from the amalgama the coat of oxyde formed on it during its fusion.

Useful Alloy.

M. Frick, in melting together 50 parts of copper, 31.20 of zinc, and 18.75 of nickel, obtained a metallic alloy, white, not oxidible, very ductile, and which acquires a beautiful polish; in varying these proportions, viz. by taking 53.39 of copper, 29.13 of zinc. and 17.48 of nickel, he produced an alloy which has the sound and unchangable nature of silver, but harder. It is particularly suitable for ornaments, objects of saddlery, boxes, watch chains, &c. This alloy was sold at first at 12 francs per pound, but as nickel is sufficiently abundant in Germany, and as many artists are engaged in this composition the price will necessarily fail.—*Bull d'Encour. Juil.* 1826.

Polytechnic and Scientific Intelligence.

ASTRONOMICAL SOCIETY.

(Continued from Page 53.)

Feb. 8.—The annual general meeting of the society took place this day, when the Council presented their Eighth Report, which is much too elaborate for our insertion. It exhibits the increasing prosperity of the Society, and the advantages that have arisen and appear to be likely to result from their labours.

Two medals have been awarded this year by the Council. One to Sir Thomas Macdougal Brisbane for the inestimable benefit conferred by him on astronomical science, in the establishment of his observatory at Paramatta in New South Wales, and for the valuable and important series of observations made there by himself, and under his directions, during his residence as governor of that colony. The other to Mr. James Dunlop, for his disinterested and indefatigable pursuit of astronomical researches, subsequent to the departure of Sir T. M Brisbane from the colony of New South Wales, whereby he has added, in a most material degree, to our knowledge of the nebulæ of the southern hemisphere.

March 14.—The first paper read this evening was on an Ephemeris, of the place of Encke's Comet, during the time of its re-appearance at the end of the present year. Drawn up at the request of the Council of the Society. By F. Baily, Esq.

The first part of the ephemesis (to the end of the year 1828 is taken from Mr. Encke's own computations for Paris time Oct. 3, as inserted in Professor Schumacher's *Astronomische Nachrichten*, No. 123. That part of it which

belongs to the ensuing year 1829, is taken from a letter addressed to the President of this Society by Dr. Olbers, and is computed for the time of midnight at Paris. The positions are computed for every third or fourth day only, at the beginning and end of the ephemeris, and for every second day towards the middle: this being quite sufficient to enable the observer to find the place of the comet in the heavens. The original computations are extended only to minutes of space; but the right ascensions are here converted into the nearest second of time, for the convenience of the observer.

There was next read a paper, "on finding the rates of time-keepers;" by E. Riddle, Esq. In this communication the author observes, that there are many persons fond of astronomy who are not possessed of a transit instrument, or who have not a convenient situation in which to place it; and many others, such as nautical men in particular, who have not the means of using one, who are desirous on many accounts, of knowing the *rates* of their chronometers, independent of the absolute time which they indicate. The method of equal altitudes on *each side* of the meridian is the course usually pursued on such occasions: but Mr. Riddle proposes another mode, often much more convenient in practice and equally correct in its results; viz. by taking equal altitudes of a fixed star on the *same side* of the meridian, on successive nights. It is well known that a star will, at the same sidereal hour, arrive at the same altitude, for several succeeding nights: the only difference which occurs, arising from the small change in the aberration, and also from the variation in the refraction. The former is insensible, if the interval between the observations be not too long; and for the latter, appropriate tables are given. The best time for the observation of such stars is when they are due east or

west; and any known star may be chosen for the purpose. All we have to do therefore, is to note the difference of the two consecutive times at which the star attains the same altitude (whatever it be) on the same side of the meridian; and if that difference be *less* than $3^m. 55^s$, 91, the chronometer (presuming that it is regulated to mean solar time) will have *gained;* and if *more*, it will have *lost* so much in a sidereal day. And, if the observations are made at an interval of *n* days, the *n*th part of the difference between the times of observation, compared with 3^m 55^s, 91, will in like manner give the mean rate for that interval; and, if this quantity be multiplied by 1,0027, it will give the rate for a mean solar day. The author concludes his paper with several practical examples of the method; and also with a formula for reducing a series of observations made on any one night, to the same altitude as shown by a series made on any other night: whereby the whole become strictly comparable.

Lastly, there was read a communication from the Rev. Thomas John Hussey, to Francis Baily, Esq. On forming a correct catalogue of the stars situated between 15° N. and 15° S. declination, and extending from 13^h 56^m to 15_h 4^m R.A. from the catalogues of Piazzi and Bradley, and the observations of Lalande and Bessel.

April 11.—A paper was read " On the construction of large Achromatic Telescopes." By A, Rogers, Esq.—In this paper the author describes a new construction of an Achromatic Telescope, the object of which is to render a small disc of flint glass available to perform the office of compensation to a larger one of crown, and thus to render possible the construction of telescopes of much larger aperture than are now common, without hindrance from the difficulty at present experienced in procuring large discs of flint glass. It is well known that in the

ordinary construction of an achromatic object-glass, in which a single crown lens is compensated by a single one of flint, the two lenses admit of being separated only by an interval too small to afford any material advantage in diminishing the diameter of the flint lens, by placing it in a narrower part of the cone of rays, the actual amount of their difference in point of dispersive power being such as to render the correction of the chromatic aberration impossible, when their mutual distance exceeds a certain limit.

This inconvenience Mr. Rogers proposes to obviate, and obtain the advantage in question, by employing as a correcting lens, not a single lens of flint, but a compound one, consisting of a convex crown and concave flint, whose foci are such as to cause their combination to act as a plane glass on the mean refrangible rays. Then it is evident that by reason of the greater dispersive power of flint than of crown glass, this will act as a concave on the violet, and as a convex on the red rays; and *that* the more powerfully, according as the lenses separately have greater powers or curvatures. If, then, such a compound lens be interposed between the object-glass of a telescope, supposed to be a single lens of plate or crown glass, and its focus, it will cause no alteration in the focus for mean rays, while it will lengthen the focus for violet, and shorten it for red rays. Now this is precisely what is wanted to produce an achromatic union of all the rays in the focus; and, as nothing in this construction limits the powers of the individuals composing the correcting lenses, they may therefore be applied any where, that convenience may dictate; and thus, theoretically speaking, a disc of flint glass, however small, may be made to correct the colour of one of crown, however large.

But this construction possesses other and very remark-

able advantages. For, first, when the correcting lens is approximately constructed on a calculation founded on its intended aperture, and on the refractive and dispersive indices of its materials, the final and complete destruction of colour may be effected, not by altering the lenses by grinding them anew, but by sliding the combination nearer to, or further from, the object-glass, as occasion may require, along the tube of the telescope by a screw motion, till the condition of achromaticity is satisfied in the best manner possible. And, secondly, the spherical aberration may in like manner be finally corrected by slightly separating the lenses of the correcting glass, whose surfaces should for this purpose be figured to curvatures, previously determined by calculation, to admit this mode of correction—a condition which the author finds to be always possible.

Mr. Rogers explains his construction by reference to a diagram, and states the rule for the determination of the foci of the lenses of the correcting glass in a formula which may be thus interpreted. "The focal length of either lens of the correcting lens is to that of the object-glass, in a ratio compounded of the ratio of the square of the aperture of the correcting lens to that of the object-glass, and of the ratio of the differences of the dispersive index of crown and flint glass, to the dispersive index of crown;" —for example, to correct the colour of a lens of crown or plate glass of nine inches aperture, and fourteen feet focal length (the dimensions of the celebrated telescope of Fraunhofer at Dorpat) by a disc of flint glass three inches in diameter, the focus of either lens of the correcting lens will require to be about nine inches. To correct it by a four inch disc will require a focus of about sixteen inches for each.

The author then remarks, that it is not indispensable to make the correcting glass act as a plane lens. It is suffi-

cient if it be so adjusted as to have a shorter focus for red rays than for violet. If, preserving this condition, it be made to act as a concave lens, the advantage procured by Mr. Barlow's construction of reducing the length of the telescope with the same focal power, is secured: and he considers, moreover, that by a proper adaptation of the distances, foci, &c. of the lenses, we might hope to combine with all these advantages, that of the destruction of the secondary spectrum, and thus obtain a perfect telescope.

There was also read a portion of a paper "On the Occultation of δ Piscium observed in Blackman Street, in the month of February 1821. References to recorded observations of occultations in which peculiarities have been apparently seen, either at the moon's limb, or upon her disc; together with an enquiry how far certain hypotheses seem adequate to account for the phenomena. By James South, Esq."

PROCEEDINGS OF THE ROYAL SOCIETY OF EDINBURGH.

November 26th.—At a general meeting of the Royal Society, the Officers were elected for the present year.

Dec. 3.—Dr. Turner read the first part of a paper, entitled "An Examination of the Ores of Manganese."

A letter from Captain Parry to Dr. Brewster was read, accompanying two sets of hourly meteorological observations made on the ice and on board the Hecla on the 17th of July last. The first of these sets of observations were made in 82½° N. latitude, the highest at which a meteorological instrument was ever used. The second set was made in lat. 79° 55′ in a harbour on the north-east of Spitzbergen. In this letter Captain Parry mentions the curious fact, that they experienced that season

at least twenty times as much rain as in any other summer they passed in the arctic regions.

A Paper by Mr. Thomas Graham, M. A. was read on the influence of the Air in determining the Crystallization of Saline Solutions.

The following, among many objects of natural history and the fine arts, were presented to the Society by George Swinton, Esq. Secretary to the Government, Calcutta, and F. R. S. E.

1. Three fine Marble Statues of Burmese gods.
2. Two Models, as large as life, of a Dwarf now in Calcutta.
3. Head of a Dugong.
4. Numerous Barrels and Bottles, containing Snakes from various parts of India.
5. An Armadillo.
6. Ship Fish from Arracan.
7. Head of a Horned Beetle.
8. Book of Natural History in the Talien language.
9. Two Dresses of Carien Women of Tavoy.
10. Bamboo joints containing Tabasheer.
11. Specimens of the Shola, in its natural state, and formed into sheets like paper.
12. Corals and Shells.
13. Specimens of Oils, Varnishes, Bhela or marking Nuts, Gums, Minerals, &c.
14. Stuffed Birds.
15. Large Sponge, or Neptune's Cup, from Singapore.
16. The Leaf Insect from Sylhet.
17. Skeleton of a Boa Constrictor.
18. Petrified Trunk of a Tree from the Irawaddy.
19. Large Chama gigas from the South Seas.
20. A pair of Elephant's Tusks.
21. Skeleton of the Iguana, &c. &c. &c.

December 17*th.*—Conclusion of a Chemical Examination of the Oxides of Manganese. By. Dr. E. Turner.

A Notice on the formation of Alcoates, definite compounds of Alcohol and Salts, analogous to the Hydrates. By T. Graham, M. A.

January 7, 1828.—Francis Walker Drummond, Esq., and Sir W. G. Gordon Cumming, Bart., were elected Ordinary Members.

The Vice-President announced to the meeting that the Council had adjugded the biennial Keith prize to Dr. Brewster, for his communications regarding his discovery of two new immiscible fluids in the cavities of certain minerals.

The following papers were read:—

1. Account of a remarkable peculiarity in the Structure of Glauberite. By Dr. Brewster.

2. On the Chloro-ferro-cyanic Acid and its compounds. By J. Johnstone, A. M.

3, An Account of the Tracks and Foot marks found impressed on Sandstone in a quarry in Dumfries-shire. By the Rev. Dr. Duncan.

Specimens were exhibited.

4. Demonstrations of propositions published by Dr. M Stewart in 1746, at the end of his general theorems. By A. Galloway.

5. A letter from the Right Honourable the Countess of Morton, to Sir Walter Scott, accompanying a donation of models and plans, &c. connected with the erection of the Edystone Light House, and which had belonged to the late Mr. Smeaton, Civil Engineer.

6. Experimental inquiries concerning the Laws of Magnetic Forces. By W. S. Harris, Esq. of Plymouth.

January 21.—1. Determination of the Longitude of the Observatory of Edinburgh, from observations of the

moon and moon-culminating stars. By Professor Wallace.

2. On the earliest Maritime Regulations of Modern Europe. By John Reddie, LL. D.

February 4.—Erskine D. Sandford, Esq. Dr. D. Maclagan, James Crawford Gregory, M. D. Sir Alexander Keith, Knight Marischal, and John Frost, Esq. were elected ordinary Members.

1. A notice regarding a Mass of Metallic Iron, (supposed to be meteoric) from South America. By T. Allan, Esq.

2. On the Natural History and properties of Tabasheer, the sileceous concretion found in the joints of the bamboo. By Dr. Brewster.

February 18.—1. Notice regarding a compendious and easy method of performing the operation of Multiplication in Arithmetic. By Professor Wallace.

2. Part 1st. of a Memoir on the Geographical position of Ecbatana, the ancient capital of Media. By the Rev. J. Williams.

March 3.---Captain Maxwell, K. D. G. was admitted an Ordinary Member.

1. A notice of some experiments on the Absorption of Vapours by Liquids. By T. Graham, A. M.

2. Chemical examination of Tabasheer. By Dr. E. Turner.

Proceedings of the Society for Promoting the Useful Arts in Scotland.

December 4, 1827. --A notice by Dr. Brewster, on the Varnishes from the Varnish Trees of India was read, and specimens of articles varnished with them, and sent home by George Swinton, Esq. of Calcutta, were exhibited.

An account of the poisonous qualities of the Indian varnishes, by Dr. Brewster, was also read.

An account of the method of blasting rocks in Assam, communicated by George Swinton, Esq. of Calcutta.

There was also read an account of the Black Dye of Siam, by Captain Burney. Communicated by George Swinton, Esq.

December 19.---There was read a Description of a new Latch Lock, by the Rev. Mr. Brodie. The model of the Lock was exhibited.

A Pendulum Chronometer belonging to Andrew Waddell, Esq. executed by Mr. David Whitelaw, of Edinburgh, was described and exhibited.

Specimens of Screws made by Mr. Clark were exhibited.

There were read Observations on the Low Temperature of Steam escaping from under High Pressure. Communicated by Thomas Graham, A. M.

An improved Air Pump was described and exhibited by Mr. Dunn.

The following gentlemen were elected honorary members:

Captain Parry, R. N. John Oldham, Esq. of the Bank of Ireland.

Mr. John P. Bertram, Clyde Street, was elected an Ordinary Member.

Dr. Hugh Colquhoun, Glasgow, and Mr. Thomas Clark, Glasgow, were elected associate members.

January 9, 1828.---There was read a notice of a method of manufacturing the Nepaul Paper, communicated by George Swinton, Esq.

Mr. J. W. Johnston of Durham was elected an associate member.

January 23.---An account of a new process for obtain-

ing Absolute Alcohol, by Thomas Graham, A. M. was read.

A farther account, by Dr. Wallich, of the Manufacture of the Nepaul Paper was read. Specimens of this Paper in its natural state, and as remanufactured at Calcutta, were exhibited.

There were exhibited to the Society impressions of Drawings executed on Talc. Communicated by George Swinton, Esq.

An account of an Engine for cutting the tools for grinding Lenses, by the Right Honourable Lord Oxmantown, was read.

The Right Hon. Lord Oxmantown was elected an Honorary Member.

Feb. 6.---The following gentlemen were elected Honorary Members: S. P. Rigaud, Esq. A. M. F. R. S. Savilian Professor of Astronomy, Oxford.---G. B. Airy, Esq. Lucasian Professor of Mathematics, Cambridge---Rev. W. Whewell, M. A. Trinity College, Cambridge.

The following papers were read. Observations on the formation of Ice in India. By David Scott, Esq.

Notice respecting a powerful Aromatic Oil obtained from Malwa in India, from a particular species of grass.

Mr. Lizars exhibited impressions of Engraving on different kinds of Paper, including the Nepaul Paper exhibited at last meeting of the Society. Mr. L. reported that the coarser kind of the Nepaul Paper is well adapted for the purposes of Engraving.

Feb. 20.---Observations on Street Railways. By Mr. Alexander Scott, Ormistan, were read

A Description of a Method of Cutting leading Screws, exhibited at a former meeting, was read. Drawings of the Apparatus employed were exhibited. By Mr. J. Clark.

The Working Model of a Hydraulic Engine by Mr. Ruthven was exhibited.

A Notice regarding the proper forms of Taps and Dies for cutting metal Screws. By John Robison, Esq. F. R. S was read.

Sir John Seppings was elected an Honorary Member.

Robert Aytoun, Esq. and James Tod, Esq. were elected Joint Secretaries of the Society, in room of Dr. Turner and Professor Wallace, who retired.

March 5.---There was read a Notice of the qualities and adaptation af a species of Stone brought from Caithness. Communicated by Sir John Sinclair, Bart. Specimens of the Stone were exhibited.

The masses of stuff from Nepaul for making paper having now arrived, were exhibited.

National Repository of Works of Art.

This Institution, the commencement of which we mentioned in our last, begins to assume a character of considerable importance; for, beside the support of many of the nobility and gentry, His Majesty has signified his desire to become Patron.—Our present limits will not allow us to say much upon the subject.

The Committee of Management have advertised a very slight sketch of the plan upon which they intend to proceed in the selection of articles for exhibition, viz.

First Class.—Entirely new and ingenious constructions of any sort where a new principle is discovered, or one before known but never practically adopted, is brought into operation.

Second Class.—New adaption of some known princi-

ple, but in a manner essentially different from all that has been done before in that line of manufacture or mechanical workmanship.

Third Class.—Every sort of improvement upon a discovery already made, by which the preparation of any article is facilitated, or its utility increased. In this class may be exhibited also such objects as are highly finished or distinguish themselves by exquisite taste; likewise, every description of elaborate ornamental workmanship, such as would not find a place in an exhibition of arts.

The project appears to have met with very great encouragement from the manufacturing districts, and the Repository is intended to be opened in the course of the present month. We find that the attempt will be rather premature; but, next year, when the plan is sufficiently known, have no doubt that an exhibition will be produced worthy of the British nation.

Scotch Patents,

GRANTED IN 1827.

(*Continued from Page* 112)—VOL. XIV.—FIRST SERIES.

June 14. For certain improved machinery for spinning cotton. To Philip Jacob Heisch, London.

30. For improvements in machinery for hackling or dressing and cleaning hemp, flax, and tow. To Solomon Robinson, county of York.

July 2. For certain improvements in machinery for the purpose of spinning wool, cotton, &c. To Lambert Daxter, London.

5. For certain improvements on locomotive or steam carriages. To Timothy Burstall and John Hill, both of Leith.

17. For certain processes for rendering distillery refuse productive of spirits. To Robert More, county of Stirling.

August 4. For certain improvements in the process of preparing and cooling worts or wash from vegetable substances for the production of spirits. To Robert More, county of Stirling.

8. For certain improvements in apparatus for spinning fibrous substances. To William Church, of Birmingham.

23. For certain improvements on capstans. To Charles Philips, Esq. county of Kent.

Sept. 5. For certain improvements in sizing, glazing, or beautifying the materials employed in the manufacturing of paper, pasteboard, &c. To Gabriel de Soras, county of Middlesex.

October 3. For an improvement on steam engines. To Peter Burt, county of Middlesex.

24. For a new and improved method of forming and making of hollow cylinders, guns, ordnance, retorts, &c. To Joshua Horton, county of Stafford.

November 2. For certain improvements in bedsteads, beds, couches, and other articles of furniture principally designed to be used on ship-board. To Samuel Pratt, county of Middlesex.

2. For certain improvements on bedsteads, and in the making, manufacturing or forming articles to be applied to or used in various ways with bedsteads, from a material or materials hitherto unused for such purpose. To Thomas Breidenback, county of Warwick.

22. For an improved apparatus for the better manufacture of sugar from the canes. To William Fawcett, county of Lancaster.

28. For certain processes and apparatus for printing and preparing for manufacture yarns of Linen, Cotton, Silk, Woollen, or any other fibrous material. To Bennet Woolcroft, County of Lancaster.

27. For certain improvements in the combination and arrangement of mechanical powers applicable to the purposes of driving machinery, and lifting and moving heavy bodies. To Lemuel Wellman Wright, County of Surrey.

29. For certain improvements in the combination and arrangement of machinery for making metal screws. To Lemuel Wellman Wright, County of Surrey.

December 6. For a cartridge or case, and method of more advantageously enclosing therein shot or other missiles, for the purpose of loading fire-arms and guns of different descriptions. To Joshua Jenour, jun., County of Middlesex.

List of Patents

GRANTED IN THE UNITED STATES OF NORTH AMERICA, 1827.

FOR INVENTIONS AND IMPROVEMENTS.

In rolling iron, Abraham S. Valentine, Bellefont, Centre county, Pen, Jan. 3.

In the water gate for penstocks, or flumes for mills, Henry Potes, Christiansburg, Montgomery county, Virginia, Jan. 9.

In making hoes, by rolling out cast or any other steel, Chauncey Bulkley, Colchester, Connecticut, Jan. 10.

In making irons for planes; and jointers, double and single, and of all sizes and shapes, by rolling together the steel, Charles E. West, Colchester, Connecticut, Jan. 10.

In the water-proof mortar or cement, stated by him to be from a mineral, not known or used for that purpose before his application; his former patent on this subject, dated on the 11th of January, 1826, being cancelled on account of an incorrect specification; Simeon Guildford, Washington, D. C Jan. 16.

In the grist mill, Anthony Bencine, Caswell county, N. Carolina, Jan. 16.

In the plough for planting corn, &c., Hermon Russell, Lichfield, Lincoln county, Maine, Jan. 16.

In the construction of stills, for the distillation of rum, whiskey, essences, and other spirituous liquors and cordials, Edmund Capen, Boston, Mass, Jan. 17.

Of a machine, called the bearded chisel mortising machine; Silas Metcalfe, Wilmington, Vermont, Jan. 17.

In economizing the charring of wood, and the more effectual procuring of inflammable gas for working pneumatic gas engines, and other useful purposes, by a new combination of apparatus or machinery, Samuel I. Jones, Philadelphia, Jan. 17.

In the method of heating ovens, rooms, &c., Michael B. Portiaux, Richmond, Va. Jan. 17.

In the mode of making pipes, tubes and gutters, of all kinds, for the conveyance of water, above or below the surface of the earth, from clay or argillaceous earth, by machines and various operations; Joseph Putman, Salem, Mass, Jan. 17.

In the grist mill, William Benbow, Guildford county, N. C. Jan. 19.

In the mode of generating steam, Levi Silliman, Albany, New York, Jan. 19.

In stirrup irons, Daniel Powles, Baltimore, Jan. 26.

In bedstead joints and sacking bottoms, Daniel Powles, Baltimore, Jan. 26.

In the press for tobacco, cotton, and other purposes, Benjamin R. Curtis, Richmond, Va. Jan. 29.

In the machine for planking hats, Robert Bacon, Boston, Jan. 31.

In the machine for tonguing and joining boards, Elijah B. Clark, Damascus, Penn, Jan 31.

In the lamp apparatus, for heating and boiling water, and other economical purposes, Thomas Green Fessenden, Boston, Jan. 31.

In the principles of machines for navigation; John James Giraud, Baltimore, Jan. 31.

In pumps, called "the Mariner's Friend;" James Robinson and Luke Shaw, Bath, Maine, Feb. 1.

In the construction of pedestal feet for hand-irons; Edmund Smylie, New York, Feb. 1.

In the gun-lock, Simon Cromwell, Edgecomb, Maine, Feb. 3.

In the grist mill, Edward Newman, Guildford county, N. C. Feb. 6.

In the machine for cutting straw, Thomas Benbow, Guildford county, N. C. Feb. 6.

In the horizontal wind wheel or wind mill, Thomas P. Jones, New Castle, Delaware, Feb. 6.

In the machine for shelling corn, Edward Newnam, Guildford county, N. C. Feb. 7.

In steam boilers, for using anthracite coal, John Barker, Baltimore, Feb. 7.

In the chair, Jacob Daley, Baltimore, Feb. 9.

In machinery for pressing bricks, Alfred B. Crossman, Huntingdon, Suffolk county, New York, Feb. 9.

In the horizontal cast iron paint mill, Origen Packard, Wilmington, Vermont. Feb. 12.

In opening and shutting the water gate for mills, &c., Origen Packard, Wilmington, Vermont, Feb. 12.

In burning lime and brick, and boiling kettles, Solomon Hill, New Milford, Connecticut, Feb. 12.

In the rocking churn, John G. Philip, Kinderhook, New York, Feb. 15.

In the method of making copperas; Isaac Tyson, Baltimore, February 15.

In the washing machine; Chester Stone, New Haven, Connecticut, Feb. 17.

In a mode of preventing moths, or worms, from destroying hides, skins, furs, and peltry of all kinds; Samuel Storm, New York, Feb. 17.

In the machine for grinding or mixing earth, for making bricks; Benjamin K. Hill, Richmond county, Georgia, Feb. 17.

In the hay, and grain, horse-rake; Moses and Samuel Pennock, Pennsylvania, Feb. 17.

In the machine for pressing cotton, &c. Philemon White, Chatham County, N. Carolina, Feb. 19.

In the mode of constructing locks, or door fastenings, &c.; John Brown and George W. Robinson, Providence, Rhode Island, Feb. 20.

In the plough; Ryland Rhodes, Charlottesville, Albermarle county, Virginia, Feb. 20.

In the percussion gun-lock, for rifles, &c.; William A. Hart, Fredonia, N. York, Feb. 20.

In making salt; Banajah Byington, Salina, New York, Feb. 21.

In the art of building and constructing Ships, &c.; Thomas W. Bakewell, Cincinnati, Ohio, Feb. 21.

In the machine for clearing grounds of logs and brush, Squire Collins, Hillsdale, Columbia county, New York, Feb. 22.

In the art of inlaying gold or any other metal, in turtle or tortoise-shell and horn, for various ornamental and fancy articles, Uriah Bailey, Massachusetts, Feb. 22.

In manufacturing handirons, Edward Smylie, New York, Feb. 22.

In the manufacture of suspenders, A. L. Van Horn, Philadelphia, Feb. 22.

In the pump used for steam boilers, Alfred Judson, New York, Feb. 23.

In bedsteads, Chester Johnson, New York, Feb. 24.

In the bee-hive, C. Wiggins, Pennsylvania, Feb. 27.

In the grist-mill, Benjamin Overman, N. Carolina, Feb. 28.

In finishing paper, Ira White, and Leonard Gale, Vermont, Feb. 28.

In cutting garments, James G. Wilson, New York, Feb. 28.

In propelling boats, E. Fuller, R. Island, March 2.

In the mode of blowing and striking for blacksmiths, L. Hoyt, and E. Pierce, New York, March 3.

In laying ropes, called the combined jacks, rope layer, and breast-work, David Myerle, Philadelphia, March 3.

In making watch seals, S. Davis, H. P. Rabbitt, and B. B. Grinnell, Providence, Rhode Island, March 3.

In making shovels, Oliver Ames, Massachusetts, March 5.

In the machine for turning tenons, John W. Sweet and William Stedman, Massachusetts, March 5.

In the machine for grinding apples, H. E. Paine, and S. H. Russel, Ohio, March 5.

In bridges, William Woodmansee, New York, March 6.

In the machine for shearing cloth, James Collins, Maine, March 6.

In the water wheel for saw mills, Thomas Shute, Tennessee, March 6.

In a machine for cutting metallic and other hard substances, John H. Hall, Virginia, March 7.

In the spring hammer, for blacksmiths, James Rainey, North Carolina, March 7.

In a composition of matter with which marbles, granites, and stones of all descriptions are perfectly imitated, Louis Matthy, New York, March 7.

In inserting, or ingrafting teeth, E. A. Bigelow, Vermont, March 8.

In spur or bevel gearing for mills, &c. Charles Neer, Waterford, Saratoga county, New York, March 9.

In crank and wheel dampers for chimneys, James Reilly and John Flanagan, Waynesburg, Franklin county, Penn, March 10.

In the horizontal wind mill, Jonathan Reynolds, America, Dutchess County New York, March 15.

In the machine for cutting straw, &c. Calvin Chamberlin, America, Dutchess County, New York, March 15.

In the manufacture of hatter's cards or jacks, Joseph C. Seely, Dutchess county, N. York, March 15.

In the mode of constructing the feet of brass hand-irons, &c., John Griffiths, N. York, March 15.

In an instrument called the wheelwright's assistant for turning and boring hubs, &c., Cyrus W. Beach, Schoharie, N. York, March 16.

In shelling corn, George E. Waring, Westchester county, N. York, March 16.

In extracting alcohol from common proof spirits, by the use of steam, A. Wolcott, and N. Wolcott, Bloomfield, Ontario county, N. York, March 19.

In a spring temple for looms, A. Jenks, and J. Clewell, Holmesburg, near Philadelphia, March 19.

In the grist mill crusher and sheller, John G. Morse, Randolph county, N. C. March 20.

In the machine for making bricks, David Rising, Alchester, Vermont, March 21.

In the method of pumping water out of Ships by manual power, Thomas Brownell, N. York, March 23.

In an improved cooking stove, Joseph R. Page, Philadelphia, March 24.

In a machine for pressing, and for lifting, heavy bodies, Samuel Andrews, Bridgetown, Cumberland county, Maine, March 24.

In the twin plough, Noble G. Cryer, Wentworth, Rockingham county, N. Carolina, March 24.

In the churn, S. L. Bagley, Hillsdale, Columbia county, N. York, March 24.

In the method of grinding and polishing hard substances, Benjamin Green, Windsor county, Vermont, March 27.

In the horse rake, Jeremiah Baily, Philadelphia, March 30

In the manufacture of tobacco, John Allen, Jr. and Charles Geoghegan, Richmond, Virginia, April 3.

In making watch keys, John S. Davis, Providence, Rhode Island, April 3.

In cutting wood into a circular form for the sides of tubs, buckets, &c. Jeremiah Bailey. Philadelphia, April 7.

In the machine for grinding apples, Constant H. Wicks, Paris, Oneida county, New York, April 9.

In making hominy, Robert Campbell, Martinsburg, Virginia, April 9.

In the paddle wheel of a steam boat, Robert L. Stephens, Hoboken, New Jersey, April 10.

New Patents Sealed in 1828.

To William Marshall, of Fountain Grove, in the parish of Huddersfield, in the County of York, shear manufacturer, for his invention of improvements in machinery for cutting or shearing, cropping and finishing cloth and other articles, manufactured from wool or other raw materials.--26 April.—2 Months for Inrollment.

To Thomas Breidenback, of Birmingham, in the County of Warwick, merchant, for his invention of a machine, or improved mode by use of machinery for forming or manufacturing tubes or rods, and for other purposes.--26 April. 4 Months.

To James Griffen, of Witny Moor Works, near Dudley, in the County of Worcester, scythe manufacturer, for his invention of an improvement in the manufacturing of scythe backs, chaff knife backs, and hay knife backs.—26 April.—6 Months.

To John James Watt, of Stracey Street, Stepney, in the County of Middlesex, surgeon, for his discovered by the application of a certain chemical agent, by which animal poison may be destroyed and the disease consequent thereon effectually prevented.—29 April.—6 Months.

To Charles Carpenter Bombas, of the Inner Temple, Esq. for his invention of improvements in the propelling of locomotive carriages, and machines, and boats, and other vessels.—29 April.—6 Months.

To Thomas Millman, of Mill Wall, Poplar, in the County of Middlesex, mast maker, for his invention of certain improvements in the construction and fastening of made masts.—1st of May.—6 Months.

To Jonathan Brownill, of Sheffield, in the County of York, cutler, for his invention of an improved method of transferring vessels from a higher to a lower level, or from a lower to a higher level on canals; and, also, for the more conveniently raising or lowering of weights, carriages, or goods on rail roads, and for other purposes.--1st of May.-6 Months.

To James Palmer, of Globe Road, Mile End Road, in the County of Middlesex, paper-maker, for his invention of certain improvements in the moulds, machinery, or apparatus for making paper.—6 May.—6 Months.

To Thomas Adams, of Oldbury, in the County of Salop, manufacturer, for his invention of certain improvements on instruments, trusses, or apparatus for the relief, or cure of hernia or rupture.—6 May.—6 Months.

To Francis Westley, of Leicester, cutler, for his invention of certain improved apparatus to be used for the purpose of whetting, or sharpening the edges of the blades of knifes or other cutting instruments.—6 May.—2 Months.

To Samuel Brooking, Esq. of Plymouth, in the County of Devon, a rear-admiral in our royal navy, for his having invented a certain turning or shipping fid for securing and releasing the upper masts of ships and vessels.—6 May.—6 Months.

To Matthew Fullwood, junior, of Stratford, in the County of Essex, Gentleman, for his invention of cement mastic or composition, which he intends to denominate German cement.—6 May.—2 Months.

To John Benjamin Macneil, of Foleshill, Coventry, engineer, for his invention of certain improvements in pre-

paring and applying materials for the making, constructing, or rendering more durable, roads and other ways, which materials so prepared are applicable to other purposes.—6 May.—6 Months.

To Thomas Jackson, of Red Lion Street, Holborn, in the County of Middlesex, watch-maker, for his invention of a new metal stud, to be applied to boots, shoes, and other like articles of manufacture.—13 May.—6 Months.

To John Ford, of Wandsworth Road, Vauxhall, in the County of Surrey, machine-maker, for his invention of certain improvements in machinery for clearing, opening, scribbling, coombing, slubbing, and spinning wool, and for carding, roving, or slivering and spinning cotton, short stapled flax hemp and silk, either separately or combined: and for spinning or twisting long stapled flax hemp, silk, mohair, or other fibrous substances, and either separately or combined.—13 May.—6 Months.

To Thomas Bonsar Crompton, of Tamworth, in the County of Lancaster, paper-maker, and Enoch Taylor, of Marsden, in Yorkshire, millwright, for their invention of certain improvements in that part of the process of paper-making which relates to the cutting.—13 May.—2 Months.

To Charles Chubb, of St. Paul's Church Yard, in the City of London, patent lock manufacturer, for his invention of certain improvements in the construction of latches, which may be used for fastening doors or gates.—17 May. 6 Months.

To Thomas William and John Powell, of the City of Bristol, glass merchants and stone-ware manufacturers, for their invention of certain improvements in the process, machinery, or apparatus, for forming, making, or producing moulds or vessels for refining sugar; and, in the application of materials hitherto unused in making the said moulds.—17 May.—2 Months.

Meteorological Journal kept at the London Institution.

DATE.	TIME.	BAROM.	Thermometer. IN.	OUT.	WIND.	REMARKS.
April 26	9	30·00	56	49·8	S. W.	Fine
	3	30·00	59	55·4	S. W.	Very Fine
28	9	30·35	57	56·8	S. W.	Fine
	3	30·35	62	64·6	S. W.	Ditto
29	9	30·30	58	57·6	W.—S. W.	Ditto
	3	30·30	64	67·8	S. W.	Ditto
30	9	30·35	58	59·8	N.	Cloudy
	3	30·40	60	61·2	N. by E.	Cloudy
May 1	9	30·40	55	51·4	N. E.	Foggy
	3	30·40	57	54·2	N. E.	Fine
2	9	30·35	57	52·2	N.	Ditto
	3	30·35	58	55·6	N.	Ditto
3	9	30·30	57	51·8	E.	Rain
	3	30·30	59	55·6	E.	Fine
5	9	29·75	56	52·4	N. W.	Showery
	3	29·75	59	56·8	N. W.	Fine
6	9	29·80	55	49·6	W.	Foggy
	3	29·80	58	53·2	W.—N. W.	Showers
7	9	29·90	55	50·2	N.	Cloudy
	3	29·90	57	53·4	N. E.	Cloudy, rain at night
8	9	29·90	56	53·2	N. by E.	Ditto
	3	29·95	59	55·4	N. E.	Ditto
9	9	30·10	55	50·2	N. W.	Ditto
	3	30·15	66	56·4	N. W.	Ditto
10	9	30·20	56	53·2	E.	Fine
	3	30·20	59	59·8	W.	Cloudy
12	9	30·30	56	52·2	N.	Fine
	3	30·30	59	59·8	W.	Ditto
13	9	30·30	57	57·2	W.—S. W.	Ditto
	3	30·30	60	62·4	W.	Ditto
14	9	30·20	59	57·8	N. E.	Ditto
	3	30·15	61	61·8	E.—N. E.	Ditto
15	9	30·10	59	57·2	E.	Ditto
	3	30·05	63	62·4	E.	Ditto
16	9	29·95	60	60·4	N. E.	Ditto
	3	29·90	64	65·6	E.—N. E.	Fine, thu. & ligt. at night
17	9	29·85	61	61·8	E.	Fine
	3	29·85	64	67·4	E.	Ditto
19	9	29·85	58	57·6	E.	Fine
	3	29·90	63	61·2	E.	Ditto
20	9	29·90	59	58·8	E.	Ditto
	3	29·90	62	62·4	E.—N. E.	Ditto
21	9	29·65	58	57·4	E.	Rain, about 9.
	3	29·65	60	59·2	E.	Cloudy, Rain at 6.
22	9	29·65	57	56·8	E.—N. E.	Rain
	3	29·65	59	59·2	E.	Cloudy
23	9	29·65	60	56·6	N. by E.	Ditto
	3	29·60	63	59·4	E.	Ditto
24	9	29·55	60	59·8	S. by E.	Heavy rn. about 6 m.
	3	29·50	64	64·2	S. E.	Fine

CELESTIAL PHENOMENA FOR JUNE, 1828.

D.	H.	M.	S.	
1	0	0	0	⊙ before the clock 2′ 33″
1	12	0	0	☾ in conj. with β in Capri.
2	20	0	0	☿ 132 in Taurus.
3	11	47	39	♃'s 2nd satt. will immerge.
4	11	2	0	☾ in □ last quarter.
5	0	0	0	⊙ before the clock 1′ 54″
6	18	0	0	☾ in conj. with ε in Pisces.
6	23	0	0	☾ in conj. with ζ in Pisces.
7	11	1	50	♃'s 1st Satt. will immerge.
9	10	0	●	☿ in conj. with ε in Gemini.
10	0	0	0	⊙ before the clock 58″
10	15	0	0	☽ in conj. with 1 δ in Taurus.
10	15	0	0	☾ in conj. with 2 δ in Taurus.
10	17	0	0	☾ in conj. with ε in Taurus.
11	12	10	22	♃'s 3rd Satt. will immerge.
11	23	12	0	Ecliptic Conj. or ● New Moon
15	0	0	0	Clock before the ⊙ 4″
16	2	0	0	☽ in conj. with 1 α in Can.
16	3	0	0	☽ in conj. with 2 α in Can.
17	1	0	0	☽ in conj. with ο in Leo.
17	11	0	0	☽ in conj. with π in Leo.
17	12	0	0	☿ in conj. with ♄ Long. 18° in Gemini ☿. lat. 1° 36′ N. ♄ lat. 1° N. dif. lat. 36′.
18	17	0	0	♂ in conj. with τ in Sagitt.
19	14	0	0	☽ in conj. with υ in Leo.
20	0	0	0	Clock before the ⊙ 1′ 9″
20	2	52	0	☽ in □ first quarter.
21	0	8	0	⊙ enters Cancer.
22	21	0	0	☽ in conj. with λ in Virgo.
22	21	0	0	☽ in conj. with ♃. Long. 4° in Libra. ☽ lat. 57′ 50″ N. ♃'s lat. 1° 14′ N. diff. lat. 16′ 10″
24	5	0	0	☽ in conj. with 4 ζ in Libra.
24	13	0	0	☽ in conj. with ϑ in Libra.
25	0	0	0	Clock before the ⊙ 2′ 13″
27	3	43	0	Ecliptic opposition, or ○ Full Moon.
28	21	0	0	☾ in conj. with β in Capri.
30	0	0	0	Clock before the ⊙ 3′ 14″
30	20	0	0	☾ in conj. with δ in Aquarius.

☽ The Waxing Moon:—☾ The Waning Moon.

Rotherhithe J. LEWTHWAITE.

METEOROLOGICAL JOURNAL, FOR APRIL AND MAY 1828.

1828.	Thermo.		Barometer.		Rain in inches.	1828.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low.	High.	Low.			Hig.	Low.	High.	Low	
APRIL						MAY					
26	61	41	29,96	29,82	,125	11	66	47	30,03	30,00	
27	63	33	30,17	30,16		12	65	48	30,16	30,11	
28	70	37	30,20	Stat.		13	66	38	30,18	30,16	
29	73	39	30,09	30,07	,05	14	71	38	30,12	30,06	
30	64	47	30,29	30,07		15	66	41	30,02	30,00	
MAY						16	71	51	29,85	29,85	
1	60	35	30,29	30,26		17	72	51	29,81	Stat.	
2	61	34	30,19	30,05		18	68	51	29,79	29,76	
3	58	40	29,96	29,94		19	64	40	29,76	Stat.	
4	60	48	29,80	29,70		20	66	49	29,76	29,71	
5	54	42	29,70	29,66		21	61	45	29,56	29,54	
6	60	37	29,70	29,66		22	63	47	29,56	29,54	,075
7	58	35	29,84	29,76	,025	23	64	45	29,57	29,53	,15
8	59	44	29,85	29,84		24	62	51	29,45	29,40	,55
9	61	33	30,03	29,96		25	63	51	29,74	29,61	,15
10	64	33	30,11	30,07							

LOWER EDMONTON CHARLES H. ADAMS.

Lat. 51° 37′ 32″ N 30 Long. 3′ 51″ W. of Greenwich.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. IV,

[SECOND SERIES.]

Original Communications.

Art. XVI.—On the proper forms for Taps and Dies. By Mr. John Robinson, of Edinburgh.

To the Editors of the London Journal of Arts, &c.

Gentlemen.—I use the freedom of presenting to your inspection a paper on the proper forms of taps and dies, for cutting screws, which was lately read before the Society of Arts here; if you think it of sufficient importance to occupy a place in your Journal, it is at your service to insert, or to make such extracts from as you may think proper.

There are few operations in practical mechanics of more frequent occurrence than the making of screwed work, and still fewer in which there is a greater variety of methods and contrivances resorted to, in order to produce useful results I do not at present propose to enter on the theoretical principles of any of the methods followed for this purpose, or even to notice the processes to

which artists have recourse, when screws of rigid accuracy are required, but shall confine myself to the consideration of the proper form to be given to the most important, because most generally used implements. I need hardly add that I mean taps and dies.

In the forming of these instruments, we have almost as many fancies as there are workmen who use them; some file longitudinal grooves in their taps, others fill them into prisms of three, four, or more sides, some give them much taper, others very little; but all find that great force is necessary in applying them so as to produce a full thread, and that almost invariably a part of the thread is formed by the burr which is turned up by the force of the tap. Much time is also consumed by the necessity of working slowly, to avoid bursting the work, and by the frequent removal and cleaning of the tap. The occasional breaking of a tap in the work, is also a consequence of the erroneous form given to it, which makes so great a strain necessary to force it round.

In the formation of the dies, the same differences occur in practice, a variety of notches and cutting angles are made, in the hope of producing a rapid effect; though every workman knows that one cutting edge properly applied, is better than many when used injudiciously; accordingly it is found that when a piece of work properly prepared for being screwed, is put through a die stock, it at first frequently comes out with a double thread, or a set of confused scratches; this arises from the form of the dies being such, that at the commencement the work is pressed against a number of angular points which easily imbed themselves in its surface, though it may happen to be presented to them in a wrong direction; when the work is turned round, each of these angles makes its own track; and these tracks, when the work

has not been very carefully put in, do not correspond with one another, and so form double or confused threads and spoil it. Another important defect of dies which do not cut easily and clean, is that the great pressure necessarily applied tends to force out and elongate the work in different degrees according to its hardness or softness, or its ductility. It is owing to this effect, produced more or less by almost every process of making screws, that artists find so much difficulty in making them, so that different portions containing equal numbers of threads, shall be truly equal in length to one another, and the more strain is applied in forming the thread, the greater will be the defects arising from this cause.

Every workman is aware that a half-round opening bit with a gentle taper cuts cleaner, and with the application of less force than any other form of Broache. If the back and edges of such a bit therefore were indented with a screwed thread, we should have the best form of a tap, and instead of bruising a thread into the solid as usually done, we should with such a tap cut one clean out with a smaller effort. For this purpose I would beg leave to recommend the following process for making a good tap, representations of which are shewn in Plate VIII.

First, Prepare a plug of steel by turning it into a true cylinder of the diameter required, and form the head and neck in the usual way; then by the best means in your power have it screwed to a regular full thread from end to end, being very careful that the diameter of the bottoms of the threads at the neck end be not greater than those towards the point.

Second, Turn off the threads from a portion at the point of the tap, (say equal in length to half the diameter of the original cylinder,) in doing this leave a *slight trace*

at the bottom of the thread, then set the slide rest of the lathe at such an angle that you may cut away a part of the thread all the way from *a*, to *b*, (figs 1 and 2,) beginning at *a*, by merely touching the surface, and cutting deeper and deeper to *b*, when the cut should coincide with the cylindrical portion previously laid bare at *c*.

Third, When this is done, make the spindle of the lathe fast, so that it shall not turn round, and proceed to file off a portion like that marked *d*; fig. 1, this portion should be *very nearly* half the cylinder, excepting at the two extremities of the cut, where it should be left as in the sketch, in order to prevent a failure in the process of hardening. For the same reason when the taps are of a large size, and of cast steel, it may be prudent to begin the work by drilling a hole of some size as far into the point *c*, so as to form an opening through it when the portion *d*, is filed away. (see fig. 2.)

In fig. 1, the finished lines shew the appearance of the tap when completed, and the dots shew what is to be turned or filed off, fig. 2, is the same in perspective.

The form which I should recommend for dies is represented in figs 3 and 4.

In preparing them the parts *a*, and *b*, being brought into contact, and the cylindrical opening made to the guage of *c*, (figs. 1 and 2,) a perfect thread is to be made in it, the part *a*, is then to be separated, and two portions of the thread as at *b*, *b*, to be filed away, (leaving it entire at *a*,) so that a solid cylinder of the proper diameter for such a screw would *bed fairly on the whole surface* *b*, *a*, *b*, as represented in fig. 4, the dies should then be hardened.

In using dies prepared in this way, the work will never exhibit the double or confused thread, as the position it will be forced to assume by the blunt surface *b*, *a*, *b*, will

be a true one, and the single cutting edge of the die *b*, at *c*, will make its track in a regular direction. When the edges at *c*, get blunt by use, they may be whetted on the stone either at the original angle, or (for some kinds of work,) at an angle like *d*, *c*. The die *a*, is in no case intended to cut, but is merely to serve as a guide.

If the dies be thick, there should not be more than a few threads left in *b*, and these should be in the middle of its thickness; in *a*, on the other hand, the thicker it is, and the more threads it has, the better it will serve as a guide.

With taps aud dies so prepared, work may be executed with a degree of accuracy hardly obtainable by the ordinary methods, and it will be found on applying them, that much less force is required, and the matter cut out, will come away more like the cuttings made by a turning tool, than the particles abraded by a file; the work also will be much less strained, and the thread sounder and better defined.

I am, Gentlemen,

Your very obedient Servant,

John Robinson.

Athole Crescent, Edinburgh, 18*th June*, 1828.

Mr. R— on street lamps is received with thanks, and will be considered before the publication of our next. The information communicated in the postscript would more be deemed by us as a drawback upon any work of merit, and we have reason to know that many such have been involved in similar circumstances.

Editor.

ART. XVII.—DESCRIPTION OF A MACHINE FOR CUTTING THE EDGES OF PAPER, CARDS, &c. WITH VERY GREAT ACCURACY AS TO SQUARENESS, AND EXACT CORRESPONDANCE OF SIZE; EMPLOYED FOR CUTTING THE SHEETS OF PAPER FOR BANK NOTES, AND ALSO CALCULATED FOR CUTTING CARDS OF BUSINESS, PLAYING CARDS, AND A VARIETY OF OTHER PURPOSES. INVENTED BY JOHN OLDHAM, ESQ. OF THE BANK OF IRELAND.

To the Editors of the London Journal of Arts, &c.

GENTLEMEN.—The enclosed packet contains drawings and descriptions of my cutting press, for insertion in your Journal, upon a scale of about 16th of an inch to the foot, the size I have it made, but that may of course be larger or smaller as required for the various purposes to which it may be applied. I consider it is generally applicable to the cutting of paper, cards, and pasteboard perfectly square, and in parallelograms of uniform dimensions. All kinds of Veneer woods in various forms, whether in parrallel bands, triangular, square, or polygonal pieces, may by means of this machine, be cut out geometrically through several layers; and the same with respect to cloth, leather, and sheet metals. This machine, I have found by the experience of several years, to be very valuable to me in the Bank establishment, occasionally cutting the above substances with it, and in the hope that it will prove equally so to those of your readers who may feel disposed to try it, I most respectfully beg leave to offer the invention for their use.

In Plate VIII, fig 6, represents an end elevation of the machine. Fig. 7, a side view of the same, the letters of reference indicating the same parts of the machine in each of the figures.

a, is the top cross bar with rectangular grooves *b*, *b*; *c*, *c*, side posts; *d*, *d*, cross feet to the same, with strengthening brackets; *e*, *e*, a square box, in which the press stands, for holding waste cuttings. Fig. 8, is a cross section of the upright posts, *c*, *c*, taken horizontally. There are rectangular grooves in the upright posts, for the projecting ends of the cast iron cross bracket *f*, to slide up and down in. In the middle of the underside of this piece *f*, there is a boss, within which is a round recess, to receive the top of screw *g*, which works in the cast iron cross piece *h*, similarly made with the former, but bolted firmly to the posts *c*, *c*. Upon the screw *g*, there is a circular handle or ring *i*, for partially turning the screw, and immediately over it cross holes for tightening the press by means of a lever bar. Upon the cross piece *f*, is bolted the board *j*, and upon each end of this board is made fast the rabbetted pieces *k*, *k*, for another board *l*, to slide in. Across the middle of this board, and parrallel to the pieces *k*, *k*, the tongue piece *m*, is made fast, which fits into a groove in the bottom of board *l*. A horizontal representation of this is seen at fig. 9, and immediately under this view is also seen an end view of *l*, and *f*, connected together, and a side view of *f*, by itself. In the middle of the board *l*, is a pin for a circular board *n*, to turn upon, and upon this latter board, is placed the "material to be cut," with a saving piece between it and the circular piece which is to be divided upon its edge into any number of parts required, with a stationary index on the board *l*, to point to each.

It will now be understood, that "the material to be cut" may be turned round upon the centre pin of the board *n*, and also that both it and the board can be shifted backward and forward under the top cross piece *a*, and

between the side slide slips *k*, *k*, the surfaces of which should also be divided into inches and tenths.

The plough, fig. 10, shewn in several positions, is made to receive two knives or cutters as the "material to be cut" may require, and which are situated in the plough as I now shall describe. The plough is composed of three principal parts, namely, the top and its two sides. The top *o*, is made the breadth of the cross piece *a*, and with a handle made fast thereon. The sides *p*, *p*, are bolted thereto with bolts and nuts through corresponding holes in top and sides. The figures below give inside views and cross sections of the details of the manner the cutters and adjustments are mounted. A groove is cut down each cheek or side, in which are placed screws that are held at top and bottom from moving up and down, but that by turning cause the nuts upon them to do so, and are shewn at *q*, *q*. Those nuts have each a pin projecting inwards that go into plain holes made in the top ends of cutters *r*, *r*. The 10th and following figs. are $\frac{1}{4}$ in scale.

The cutters and the work for causing them to go up and down, are sunk into the cheeks, so as to be quite level with their inner surfaces. Fig. 11, shews one of those screws apart, how fixed, and with moveable nut and projecting pin. The top of each screw terminates with a round pin split down, and above it a pinion wheel and boss thereon, also similarly split. This pinion fits upon the split pin. Above there is a cross section of a hollow coupling cap, with steel tongue across, that fits into both the cuts of the screw pin and pinion boss, and so that when lowered upon each other must all turn together. In the middle and on the top of the upper piece *o*, the larger wheel *s*, runs loose upon its centre, and works into the two pinion wheels *t*, *t*. The wheel *o*, has mounted upon it a fly nut with wings.

It will now be seen, when the plough is in its place as at fig. 12, that if it be pushed to and fro by the right hand and the nut occasionally turned by the left, the knives or cutters will be protruded downwards at the same time, and these either will or will not advance as the coupling caps, *u*, *u*, are on or off. The ribs *v*, *v*, run in the grooves *b*, *b*, fig. 6, and keep the cutters to their duty, working steadily. The top cross bar *a*, I have made the exact breadth of a bank note, by which means both knives are made to cut at the same time. I also cut the paper uniformly to one length, and accurately square.

By the use of this and my air-pump apparatus and appendant press, the paper of 45,000 notes is fully prepared in one hour and a half by one person, and may then be printed, yet I think it better to let it lie till the following morning. The paper is not so much injured by this process, I have fully ascertained, as by the ordinary method of clipping by hand, soaking it, &c. which more or less opens and weakens the fabric while in this wet or tender state, especially bank note paper. The air pump, &c. and its appendages, I propose giving you drawings of in my next, in hopes that they may also be acceptable.

I remain, yours, very truly,

JOHN OLDHAM.

Bank of Ireland, 11*th June,* 1828.

ART. XVIII.—ON THE CONDENSATION OF COAL GAS.

To the Editors of the London Journal of Arts.

GENTLEMEN.—Manufacturers of coal gas are not perhaps generally aware how much the process of *condensation*, contributes towards the *purity* of the gas.

Coal gas should not be subjected to the *purifier*, (that is to a vessel containing certain ingredients having an affinity for sulphur) until it has been first thoroughly cooled, or *condensed*, as it is termed, and divested of its tar and other oleaginous particles; and also of its hydro-sulphuret of ammonia. It contains these in great abundance when first evolved, and unless it be well condensed will never get sufficiently rid of them. After being completely diverted of these offensive ingredients by condensation, the gas may then be softly passed through the purifying vessel, to extract the *sulphuratted hydrogen*, and what remains of carbonic acid gas, &c.

The process of *condensation*, however important to the wholesomeness, purity, and even the brilliancy of gas, is still very indifferently understood, and imperfectly executed. In London the mode of condensation generally adopted is merely to pass the gas through tubes, or between plates, which are merely cooled *externately* by means of air or water, *through tubes or plates laying interposed between the gas and the water*. It must be admitted, that, if this method be pursued to a *certain extent*, and at a certain rate of experice for machinery, of course, according to that extent, the tar and other oleaginous particles, as well as a great proportion of the hydro-sulphuret of ammonia *will* be extracted; but it is a fact, which cannot be disputed, that, however expensive the vessels for condensation, (in most of the London gas works even) the condensation process has never yet been carried by any one of them so far as to divest the cooled gas sufficiently of its ammonia, either before or after passing through the purifier, and they must know that it is this very *ammonia*, which when the streets are opened, or a leakage occurs, produces that putrescent effluvia, rendering

imperfectly condensed gas so extremely offensive, and pernicious.

In the beginning of 1823, Mr. Tait, Civil Engineer, then in charge of the Bow Oil Gas Works, communicated to one of the Directors of the city of London Gas Works, a plan, which he had conceived of bringing the crude gas, *in immediate contact with the cold water, in the condensor;* thus proposing to combine the effect of the *temperature*, not the *chemical affinity*, which it is well known water has for ammonia. The idea was fully appreciated by the scientific gentlemen to whom it was imparted, but not at that time put in execution. In 1825, however, Mr. Tait, having been sent down to Ayr, in Scotland, to erect gas works there, for the British gas company, constructed a *condensor*, on the above mentioned principles. The gas made at Ayr, has been tried by several individuals, (perfectly competent to judge of the purity and quality of carbonetted hydrogen gas, and they have invariably declared *it to be the purest and best gas they have ever seen or examined.* The superiority of the gas here is chiefly ascribed to the effect of the very excellent condensation. At Dalkeith, Mr. Tait has since constructed a similar condensor; but the works there having fallen into an imperfect management, and ignorant hands, cannot of course be referred to, as proving in one way or another.

I am Gentlemen,

Yours, &c.

Edinburgh, 16*th June*. X.

We have been promised a drawing and more minute description of Mr. Tait's improved condensor, (as erected at Dalkeith,) which we shall have much pleasure in submitting to our readers when it arrives. EDITOR.

Art. XIX.—On the Invention of Money and Medals. By Mr. B. Cook.

To the Editors of the London Journal of Arts, &c.

Gentlemen.—Your approval of my former paper on Money and its representatives in Trade and Commerce inserted in the XIth Vol. of the London Journal of Arts, has induced me to present you again with another paper, connected with the same subject.

The study of coins and medals, has been a subject of amusement to me for many years, because, in endeavouring to trace the progress of money, its improvement, and introduction into the different kingdoms of the earth I have found that it exhibits the progress of art and science, and the gradual developement of the powers of the human mind.

The study of money, is the study of the efforts and genius of man. Placed as he was upon the earth, to preserve himself, and to multiply his species, he brought with him into existence an intelligence, capable of supplying his weakness, and enabling him to invent all the sciences and discover all the arts. These marvellous discoveries were the fruit, not of the genius of a few individuals, but of all the master spirits of the earth—not of a single period of time, but the combined wisdom of all ages.

Man, in his progress of improvement, appropriated to himself all nature. Fire became the companion of his labours, and the servant of all his wants—it aided him to work metals into all sorts of figures, and was the mighty spirit that enabled him to create and produce all the works of art. He established his habitation upon the great waters, and in pursuit of knowledge, passed from one ex-

tremity of the world to the other. He improved and changed the face of nature—directed vegetation, and subjugated to his use the animals and elements of the earth. But to assist him in all these great undertakings, it was necessary that he should have something to value, something to give to others as a remuneration for assisting him in his labours, and therefore he invented money. In the investigation of this subject, I have been assisted by several learned works, and from which I have occasionally made extracts.

Let us inquire, who were the first inventors of money? and to what nation or people the honour is due, of introducing among men a circulating something, to which universal consent has given a value and called it money,—and which, from its extensive influence on mankind, is, in Holy writ, styled the root of all evil? In almost every age, there has been, either a change in the form of money, or a variation in the value attached to it: I therefore cannot but think, that to trace its history from its first introduction upon the earth, will amuse the curious investigator of the actions, the inventions, and pursuits of man in the earliest ages of the world.

There is another powerful incentive to the study of coins and medals, as it will much assist the historian in fixing the period of events; they having almost always been struck to commemorate some great victory—some important occurrence, some era of time, highly interesting to man, which, in continuing this subject, I shall be able satisfactorily to prove, especially when, in a future paper I notice the coins and medals of imperial Rome.

In proof of this assertion that coins and medals are very often illustrative of events, I shall mention a few of the earliest coins of Greece, although it is certain, that the religion of the Greeks, as well as many of the discoveries

in science and art attributed to that people, were known ages before the first colonies were planted in that country; yet those arts were there carried to the highest state of perfection, for long before Greece began to erect temples, or even cottages, to shelter its wanderers from the inclemency of the elements, Egypt was covered with cities, temples, and palaces, and the mighty Pyramids lifted up their everlasting heads to the skies—was Egypt, then the cradle of science, or did she not derive from earlier nations her knowledge of the arts, and the principles of her massive architecture?—at what period shall we endeavour to seek, by unrolling the decayed volumes of remotest ages, for the origin of genius and art? Changes have constantly taken place on the earth! Ages, are but instants in the incommensurable duration of time! The life, that nations occupy, are but a few instants of it—before they are lost, and swallowed up in the rolling stream that sweeps away all things before it, into the vast ocean of eternity. Thus empires, kingdoms, and people with the finest and most durable monuments of their genius and art, are overwhelmed, and lost, in the night of the past, and disappear without return—Where are the mighty cities of Ninevah, Babylon and Palmyra?—and where are the people, that once thronged their busy streets?—the shops of the merchants are closed for ever! the palaces of the Princes have disappeared, and the gorgeous temples of the deities they worshipped are swept away from the face of the earth,—what was the money of these cities, that the poor gave in exchange for bread? what was the value of the circulating medium, that passed from hand to hand, to pay the workmen who were employed to erect their magnificent buildings, or to purchase for the great the luxuries of life,—all—all—are lost, except a few coins coroded by time and rust, like the few

records that remain of their former glory. And, if I turn to that once powerful and mighty nation, upon whose bosom, there still exists the vasty relics and ruins of its former power and riches, the nation of Cities, Pyramids, Temples, and Gigantic Statues—the country of Memnon, Pharoah and Joseph; and inquire who were those mighty Princes, that collected together so many millions of men, to perform such immense works, and whose genius and knowledge of the arts, enabled them to leave behind them these eternal memorials of their labours?—from whence, and by what means, were these vast stones, that have lain heaped upon each other for so many thousand of years, six hundred feet above the burning sands of the desert, brought to their distinction, and raised to this heighth by means unknown to the present race of man.

For thousands of years, they have remained, silently looking down upon the revolutions, that have desolated the earth; declaring to all ages, as they rolled by them, "the genius that reared us up, inscribed upon us *Immortality*," what was the money that paid those labourers, to enable them to purchase the necessaries of life?—the Historian has not recorded it, any more than the time in which they were built,—was it a money, selected for its peculiar form from among the minerals, shells, or stones of the earth, oblong, or oboliscal like the Belemnite, was it of metals, and what were their shapes and value? and how was it made? and what were the inscriptions upon it? Are not these inquiries worthy, the research of the Philosopher, and the man who seeks to understand, and know, what were the means and genius of the fathers of mankind? But, alas! it is almost in vain, that we search in those countries, that once were inhabited by the master spirits of the earth for traces of their ephemeral exist-

ence! a few coroded coins, medals, and engraved stones, —mounds of earth, or immense ruins, only remain; while the people and nations that produced them, as records of their power and glory, are passed away. These feeble records will not endure for ever, they are but faintly inscribed in the archives of eternity; yet it is interesting to the mind, to study the first efforts of man—the first dawnings of his mind—the first rays of genius and invention, that, breaking through the dense clouds of ignorance and barbarism, began to create something to value—some monument to rescue his name from oblivion—some worth to remain to future ages, to tell posterity, that he had lived upon the earth: or urged by his wants, and desirous to obtain from his neighbour something he had need of, he gave existence to the first rude coins, and fixed to them a value to barter with, or give in exchange for those articles he needed for the supply of his wants.

Plutarch says, the forms of the first coins, were oboliscal; or according to *Isidore*, that of an arrow; both these ways of representing the same object under different forms, proves, that the earliest coins, of which Isidore speaks, were changed into an oboliscal form at the time of Plutarch. It is certain, that long before they pointed arrows with metals, they used sharp stones, which they called *Belemnites*, or *Stones for Arrows*; and these stones no doubt, were the first money used in their transactions of barter. The same form appears to have been continued when metals were used for money, as we shall show in the prosecution of this inquiry; for we find upon many Greek medals the form of an obelisk, which was an emblem of the sun, as being like a ray of light; and therefore the first moneys of Greece, were called *obulus, obuli*. *Phocian* states, that the Athenian money had on it the figure of an obelisk; this interesting fact shows, that this

ancient form was preserved on the money by impressions at the time he refers to. The obelisks represented on the medals of Apolonia, were symbols of Apollo, and used to represent the God who protected it. Athens had for its protector Minerva, and the medals and coins of this city had struck upon them the owl, as a symbol of the Goddess. The symbol of Apollo, as I before stated, was the obelisk, and what is remarkable, had the title of *Monetalis*, as money was under his special protection, it was regarded as sacred. From this cause, in process of time, there was represented on coins and medals, the symbols, the attributes, the heads, or figures of the tutelary divinities of the cities, where the coins were struck, or the portraits of princes, that flattery substituted in their place.

The word *Symbole* of the Greeks, answers to the word *Tessera* of the Latins. Its origin, under the acceptation of this term, was derived from the *Obolus*, which was the earliest, and only mark of the weight, or value of effects exchanged by this means. This mark, became the subject of a law that determined its title; from the word *Nomoster*, it took the name of *Nomisma*, from which the Latin word *Numus*, was derived: but as it was with them the sign of the value of the things, they gave to it the name *Moneta*, from which is derived that of money, so called by us. An ancient coin of Sicily in lead, has for impression two obolu, united at their base, to represent a double *obolus*, with an inscription on it, making it as such, and this practice of writing on money, *was first used in the City of Athens.*

Upon a *Diobolus*, or double obolus, is a Greek inscription, *the Victory of Jupiter*—on another, *the Mother of the Gods*, attributing to these deities, some victory obtained through their interference and protection, and upon a medal of Macedon, is the figure of *Cybele*, with a victory

in her hand, with the legend, *Sacred to Victory*, thus returning thanks to the Goddess for advantages obtained through her means—upon another *obolus*, is the name of *Artemis*, or Diana, attributing to this Goddess a victory obtained by the City of Syracuse, which was especially under the protection of this Goddess. By the legend upon another obolus, we see it was struck for another victory, and in honour of all the immortal Gods—*Victoria Immortalium.* The Thunder of Jupiter is represented upon it, and specifies that it was the victory *Athenian !*—Syracuse was the only city in Sicily that vanquished the Athenians: yet it obtained over Athens but a single victory, it appears that it was characterised by the name Athenian, because it occasioned the total ruin of the Athenians in Sicily. In fact, the whole of the Athenian army was destroyed, not a single man escaped. They lost on this occasion, Nicias and Demosthenes, that commanded. Never was a victory more interesting, more complete, and memorable, as it delivered Syracuse from the Athenian yoke, and in guaranteeing its liberty, augmented its power and glory.

Solemn thanks were offered to all the gods, and an annual *Fête* was instituted, called *Asinara*, from the place were the battle was gained, thus we see inscribed on all the monuments remaining of this victory, the names of *Athenian* and *Asinara*, it is described by an inscription upon several coins of lead found there, and recording also that public thanks were offered to the gods, for giving them this victory, which put an end to the war. Among the beautiful medals struck at Syracuse, in silver, in commemoration of it there is a very singular one, *Unique*, and invaluable; on one side is the head of *Cerès*, one of the goddess mothers, and on the reverse a figure of victory, mounted on a car drawn by four horses, and

on it are marked a representation of the trophies erected near to the river *Asinara*, for the defeat of the Athenians, under these trophies, we read two letters Α Φ, these letters, like those marked on the *Oboli*, I have before mentioned, are the beginning of a word that signifies the Immortals. This exact correspondence of the *Oboli*, and this medal, fix the time when these monuments were erected, as well as the defeat of the Athenians near to the river *Asinara*, in the 4th year of the 91st Olympiad, and 413 years before the Christian Era, we see therefore that even at that period, money of an oboliscal form was in use in Sicily, like that, first introduced among mankind, and of which but few specimens exist at the present day. I have thus in the present paper which as I before stated, I intend only as a preface to a series of papers, on the invention of money, endeavoured to produce a few examples to prove, that the study of coins and medals, would assist the historian in fixing the correct period of many great events that have happened upon the earth, as well as enable him to form an idea, from what states or cities different countries were colonized. In the prosecution of this inquiry, I shall produce examples, to confirm this assertion, especially when I speak of the cities of Greece, and the many, and mighty events, which rose upon the stream of time during the glory of Imperial Rome.

I am, Gentlemen,

Your obedient Servant,

BEN. COOK.

Birmingham, June 17th, 1828.

Recent Patents.

To ROBERT WHEELER, *of High Wycombe, in the County of Bucks, Brewer, for his having invented or found out an improvement or improvements on, or in refrigerators for Cooling Fluids.*—[Sealed 22nd November, 1827.]

THIS improved apparatus for cooling brewers' worts or wash for distillers, and also for condensing spirits in place of the ordinary worm tub, is called by the patentee an *Archimedes Condensor, or Refrigerator,* the peculiar novelty of which consists in forming the chambers for the passage of the fluids in spiral channels, winding round a central tube, through which spiral channel, the hot and cold fluids are to be passed in opposite directions.

In Plate IX, fig. 1, represents the external appearance of the refrigerator enclosed in a cylindrical case; fig. 2, the same, one half of the case being removed to shew the form of the apparatus within, and fig. 3, a section cut through the middle of the apparatus perpendicularly for the purpose of displaying the internal figure of the spiral channels.

The apparatus is proposed to be made of sheet copper, tinned on its surface, and is formed by cutting circular pieces of thin copper or segment of circles, and connecting them together by rivits, solder, or by any other convenient means, as coppersmiths usually do. These circular pieces of copper being united one to the other, in the way of a spiral or screw, form the chambers through which the fluids are to pass within, in an ascending or descending enclined plane.

In figs. 2 & 3, *a, a,* is the central tube or standard (of any

diameter that may be found convenient) round which the spiral chambers are to be formed; *b*, *b*, are the sides of the outer case, to which the edges of the spiral fits closely, but need not be attached; *c*, *c*, are two of the circular plates of copper, connected together by rivits at the edges, in the manner shewn, or by any other suitable means; *d*, is the chamber, formed by the two sheets of copper, and which is carried round from top to bottom in a spiral or circular enclined plane by a succession of circular plates connected to each other.

The hot fluid is admitted into the spiral chamber *d*, through a trumpet or wide-mouthed tube *e*, at top, and is discharged at bottom by an aperture and cock *f*. The cold water which is to be employed as the cooling material is to be introduced through the pipe *g*, in the centre, from whence discharging itself by a hole at bottom, the cold water occupies the interior of the cylindrical case *b*, and rises in the spiral passage *h*, between the coils of the chamber, until it ascends to the top of the vessel, and then it flows away by a spout *i*, seen in fig. 1.

It will be perceived that the hot fluid enters the apparatus at top, and the cold fluid at bottom, passing each other, by means of which an interchange of temperatures take place through the plates of copper, the cooling fluid passing off at top in a heated state by means of the caloric which it has abstracted from the hot fluid, and the hot fluid passing off through the pipe and cock at bottom, in a very reduced state of temperature, by reason of the caloric which it held having been given out to the cooling fluid.

The patentee says, " I have described this apparatus a made of thin sheets of copper tinned, but do not mean to confine myself to that material as copper without tinning will answer the purpose, or under some circum-

stances I should make them of pewter, or perhaps tin plate, and for the cooling of some chemical fluids I should make some of earthern or pottery ware. These various materials being worked by different means, I cannot set forth the precise mode of manufacturing my refrigerators therefrom, nor do I confine myself to any particular mode of making the said spiral chamber, but rest my claim of invention solely upon the form of the apparatus, which I call the Archimedes refrigerator.

Though I have described this apparatus as inclosed within a cylindrical case, which forms the sides of the ascending channel, yet I do not at all times employ a case, but close the external parts of that channel by strips of metal soldered or otherwise, attached to the plates.

This apparatus is applicable to the cooling of worts, for brewers, or wash for distillers, and other chemical operations where the cooling of fluid is required. It is also applicable to the condensing of vapours, whether steam or spirituous fluid, and is employed with great advantage in place of the ordinary condensing worm of distillers, and is likewise applicable to steam engines.

The patentee observes the Archimedes Condensor, displays more surface in less space, and consequently has a greater power of cooling and condensing than any inventions hitherto introduced for those purposes.

The extent of coolers and the duration of worts in them will be essentially diminished by the adoption of this refrigerator; and, thus, the risk incidental to coolers in summer, removed; or if space be wanted, and it be desirable to do away coolers entirely, the refrigerator may be so constructed, as to receive and cool the wort, either in an open or close chamber, immediately from the Hop Back. It may, also, be applied with peculiar success to the cleansing, or starting of beer in summer.

When employed as a condensor it is a very advantageous substitute for the worm and tub; and effects a considerable saving of fuel, time, labour and first cost, and a much better spirit, (in consequence of lower condensation) will result from its use. On shipboard it will be found a valuable improvement on the present process of distilling salt water.

The apparatus may be constructed so as to produce an almost perfect transfusion of temperature by employing quantities of cooling fluid, even something less than the quantities to be cooled; but, as this would require a great length of machinery, the proportion of one and a half of cooling, to one of heated liquor, is generally observed for the refrigerator, and rather more than that of twice the volume of spirit for the condensor, when no instructions to the contrary are received. With these proportions the machines are warranted to cool; the refrigerator to four or five degrees above, and the condensor to two degrees above the cooling fluid.

Thus, by causing a remarkable saving of water, compared with other inventions for the purposes stated, they effect a commensurate diminution in the wear and tear of engines, to which is to be added the essential benefit, in many situations, (particularly in the West Indies,) of being able to work with very small quantities of water.

Their compactness is such, that a refrigerator to cool forty barrels per hour, requires only a breadth of four feet; a condensor to work a 2,000 gallons still, a breadth of about three feet; a condensor to work a 30 gallons still, a breadth of about six inches; all other sizes are proportionate, and every size, may be cleaned and repaired with perfect facility.—[*Inrolled May*, 1828.]

To Thomas Otway, *of the Parish of Walsall, in the County of Stafford, Ironmaster, for his Invention of an expedient for Stopping Horses, when Running away with Riders, or in Carriages.*—[Sealed 21st February, 1828.]

The object of the invention is to deprive an unruly or runaway horse of the power of restiveness or running away, by impeding him in his breathing. This is accomplished by producing a pressure upon the nostrils, by drawing a safety rein so as to close them either partially or entirely, and when the object is effected, the pressure is removed by slackening the rein. The invention resembles in appearance, a common nose-band of leather, attached to the head of the bridle, but rather lower than the usual position, as it is fastened by a small chain to the *cheek* of the *bit*, instead of the cheek of the bridle. On each side of the nose-band, opposite the nostrils, a piece of the leather is cut out, leaving an aperture two inches and a half in length, and five eighths of an inch in breadth or thereabouts. In each of these apertures, is fixed a small box or coffer of brass, or iron plated with silver, or other metal, which contains a small iron lever, padded with leather on the part which is to press the nostril, and attached at one end by a joint to a small rod or piece of iron, which latter passes through a hole at the end of the box, and terminates in a loop outside, to which loop the safety rein is attached. The lever and rod lie parallel to each other in the box, until the safety rein is drawn tight, when by that operation the padded end of the lever is thrown out of the box in the inside of the nose-band, and presses the external membrane of the

nostrils, and so partially or entirely closes it, as to impede or prevent the animal from breathing; the effect of which will almost instantly be to stop him, if running away, and to control him if restive.

The box contains a spring of steel, which upon slackening, the rein instantly forces the lever back into its place. It is of course material that the position of the nose-band should be exactly opposite to the nostrils, so that the levers shall press them on the right part, and to adjust this properly, the usual ornamental strap which passes down the front of the horses' bridles, is fastened to the nose-band by a buckle, which secures it in the proper situation.

In Plate IX, the apparatus is shewn in several figures. Figure 4, represents a horse's head in profile, with the safety apparatus affixed to the nose-band as at *a*, and the safety rein *b*. Figure 5, exhibits the nose-band upon a larger scale as seen in front; and figure 6, the same as seen edgewise; *a*, *a*, are the boxes affixed to the nose-band or leather strop *b*, *b*, *b*, which boxes contain the levers, springs, and rods, above mentioned. The peculiar construction of this apparatus will be best understood by reference to the section of the box containing the lever, spring, and rod, shewn at fig. 7.

In this last mentioned figure, *c*, is the lever, which turns upon a fulcruum pin *d*, passed through it, and fixed into the sides of the box; *e*, is the tail of the lever, against which the end of a spring *f*, acts for the purpose of shutting the lever down into the box as shewn in this figure; *g*, is the rod sliding through an aperture in the back part of the box. One end of this rod is connected by a joint to the lever towards the tail part, by means of a pin, and the reverse end has a staple or ring *h*, attached to it, to which the safety

rein is fastened; *i*, is a small pad of leather attached to the lever, which presses against the horses' nostrils, when the lever is projected outwards.

The apparatus being fitted on the horse by buckling on the nose-band, in the manner shewn at figure 4, when it is required to restrain or to stop the horse, the safety rein *b*, is pulled by the rider with considerable force, which draws out the sliding rods, *g*, *g*, and causes the levers with their pads to be projected as shewn in figure 8, and also in the section figure 9.

The effect of thus projecting the levers will be to pinch the nose, and force the pads *i*, *i*, into the cavities in the head through which the air passes from the nostrils for the purpose of respiration.

As soon as the tension of the safety rein is relaxed, the springs within the boxes acting upon the tails of the levers, force them in again, as at figs. 6 and 7, when the animal experiences no further impediment to breathing.

The patentee states in conclusion:—"I have exhibited in he drawing which accompanies this, my specification, certain parts of a horses' bridle, made upon the ordinary construction, and to which I lay no claim; but the boxes attached to the nose-band containing the levers, rods, and springs, as herein described, for the purpose of stopping a runaway horse in the manner above explained, being to the best of my knowledge and belief, entirely new, and never before used in this kingdom, I claim the exclusive right to make, use, and vend the same, by virtue of the above recited Letters Patent."—[*Inrolled April*, 1828.]

To George Clymer, *of Finsbury Place, in the County of Middlesex, Engineer, for his Invention of an Improvement in Typographic Printing, between plain or flat surfaces.*—[Sealed 6th September, 1827.]

These improvements in typographic printing between

two plain or flat surfaces, consist in the general arrangement of the parts of a printing machine, or press for taking off impressions from types, blocks, or other like surfaces in relief, by which arrangement the patentee considers that he shall be enabled to print between plain or flat surfaces, sheets of paper of much larger dimensions than have hitherto been printed by means of flat table platens.

By this new contrived press it is proposed to print two forms of double royal paper at one time, being a surface of four feet six inches by three feet three inches, which is twice the size of the largest newspaper at present published.

Plate IX, fig. 10, is a side view of the press; and fig. 11, a front view, in which is represented the new arrangement of the parts; the whole are not, however, claimed as new, taken separately, but only when combined in the way exhibited.

Fig. 10, the side view of the machine, exhibits it with all its appendages complete; but in fig. 11, the front view, some of the parts are omitted, to avoid confusion; *a*, *a*, is called the winter, or base, to which the ribs or brackets are fixed that the table rests upon; *b*, *b*, the table, having a flat surface on the upper side, made of the dimensions stated above; *c*, *c*, is the head or top part of the frame work; and *d*, *d*, *d*, *d*, are the cheeks or side standards, connected at top and bottom, and held fast by straps of iron *e*, *e*, *e*, *e*, secured by keys; *f*, *f*, is the *platen*, suspended by what is called a piston, and perpendicular bar *g*, the upper part of which is secured by gudgeons or trunnion joints to the infinite levers *h* and *i*; the upper of which is held to the head by gudgeons passing through screw boxes or loops.

The infinite levers *h* and *i*, are connected together by a

joint at *k*, and to this joint the rod *l*, is attached, which rod is also connected to the crank *m*.

In giving an impression, the handle, or lever *n*, is to be swung outward, which bringing the crank *m*, and the rod *l*, nearly into a straight line, will straighten the joint of the infinite levers, and force down the platen on to the face of the types, in order to give the impression. When the lever *n*, is moved back again into the situation shewn in the side view, the crank *m*, will be thrown up, and the rod *l*, be made to draw back the infinite levers, which raises the platen from the types.

It is to be here observed, that in order to assist the rising of the platen, it is suspended by rods *o*, *o*, to weighted levers *p*, *p*, which balance the platen, and enable it to be worked with very little exertion of the pressman.

The types are to be inked by means of the ordinary kind of elastic inking roller, introduced at the sides of the machine, and while this is doing, (the platen being raised to admit the inking roller) the sheets of paper are to be laid upon the tympan *q*, *q*, which by means of small carriers runs in and out of the press upon the side rails *r*, *r*.

The types being inked, and the sheets of paper properly laid upon the tympan, so as to register, the tympan carriage is now run in, between the table and form of types below, and the platen above; when the lever *n*, being swung outwards as above said, the platen is brought down with very great power, and the impression given.

On the platen rising, the tympan is again run out, and the form being inked for the next impression, another tympan at the opposite end of the press receives the sheet of paper, which is then ready to be run into the press as in the former instance.

The specification concludes by saying, it is only ne-

cessary to add, that I do not confine myself to placing the crank shaft as exhibited in the drawing, as it may be in any other situation which might be found convenient and suited to the projecting of the rod; and the impression may be given by either pushing or pulling the joint *k*, of the infinite lever; and lastly that the movement of the crank may be effected by a lever, or by any other means if preferred.—[*Inrolled March*, 1828.]

To Eugine de Masnil, *of Soho Square, in the County of Middlesex, Esq., for his Invention of an Improvement or Improvements on, or additions to, Stringed Musical Instruments.*—[Sealed 1st August, 1827.]

These improvements on, or additions to, stringed musical instruments, are described as consisting of a new kind of peg by which the instruments may be tuned. This peg is formed of one single piece, varied in its figure according to the instrument to which it is to be applied. If this peg is to be adapted to a piano-forte or harp, in which it usually turns in one bearing or thickness, the peg must be cylindrical, and terminate in a little cone at the end; if applied to a violin, violoncello, or other instrument in which the peg turns in two bearings, or two thicknesses, then the peg must be in the shape of a cone betwixt two cylinders having the same axis.

The cylindrical part of the peg penetrates into the instrument and the string is attached to the cone. Instead of a cone, a cylinder of small diameter may be used, but the conical form is the best.

One or several circular or spiral grooves are cut in the part of the peg to which the string is attached for the purpose of receiving the string, and of drawing it nearer the center of the peg. The cylinders which penetrate into

the instruments are hollow. and formed with a screw on the outside, and the peg is put in action by a turn-screw.

The object of this invention is to afford the greatest facility in coming to the mathematical point of the tone, and to impart to the instrument a tone as perfect as possible, because when the great cylinders are turned round, the strings are drawn in a very small degree.

Plate VIII. fig. 14, represents the peg first described, which is designed to be set in one bearing as in a piano-forte or harp: *a*, is the hollow cylinder formed peg, with a screw on the outside; *b*, is the little cone cut in several spiral and circular grooves. Fig. 15, is an end view of the same. There are four small holes in the end of the peg, for the turnscrew to be passed into, in order to turn it as shewn in the section at fig. 16, and there is a small hole to pass the string through, in securing it to the peg. The length of the pegs are to be about the same as the thickness of the instrument in the parts where they are inserted. In the guitar, the lengths of the pegs need not be so great in proportion.

Fig. 17, shews one of the pegs to be supported in two thicknesses or bearings as in violins, &c.; *a*, and *b*, are the cylindrical parts formed with screws; *c*, is the cone with the spiral and circular groove. Fig. 18, is a section of the last described figure with the turnscrew introduced into the holes, for the purpose of turning the peg. There is a hole in the conical part, for making fast the string to the peg. This proportion is suited for violins; but for violon-cellos, and other instruments of different magnitudes, it must be enlarged in proportion.—[*Inrolled February,* 1828.]

To JOHN LEE STEVENS, *of Plymouth, in the County of Devon, Merchant, for a New or Improved Method or Methods of Propelling Vessels, through, or on the water by the aid of Steam, or other means or power, and for its application to other purposes.*—Sealed 18th December, 1827.]

THIS invention is a method of working paddles, for the purpose of propelling vessels on water, by steam, or other power, through the agency of a series of paddles attached to a three throw crank.

Plate X, fig. 1, represents a side elevation of the machinery, as it would appear in a paddle box, when applied to the purpose of propelling; *a*, is the centre of the axis of the triple crank *c*, *c*, *c*; and *b*, is one of the bearings of the said axis, which would be supported on the side frame of the paddle box; *d*, *d*, is one of the longitudinal bars which support the other bearings of the axis of the triple crank; *w*, *w*, are transverse beams to support the ends of the bars *d*, *d*. The dotted lines represent the paddle box; *e*, *e*, *e*, are three sets of paddles, each set being carried and worked by a division of the triple or three throw crank, while the peculiar motion required for the paddles is given by means of the guide rods *f*, *f*, *f*, and the radius rods *g*, *g*, *g*, which radius rods work on a bar or centre at *h*; *i*, *i*, *i*, are spreaders to keep the paddles more steady, and cause them to work firmly.

By this arrangement it will be seen that one set of paddles is always acting against the water, and sometimes two sets at the same time. The parts marked *r*, are the paddles, and are fixed to vertical bars *l*, by

hooks and nuts in the ordinary way, the upper ends of the bars *l*, being inserted in sockets cast in the bar *k*, which is called the paddle carriage. It will of course be necessary to make a provision in the top of the paddle box to allow of the occasional rise of the bars *g*, and *f*, above it, when the paddles are in action.

Fig. 2, represents a plan of the apparatus; *m*, is the shaft from the steam engine or other power communicating motion to the triple crank, it will be seen by this figure that the paddle carriages are hung to each division of the triple crank by two bearings *n*, *n*, in the inner division, *o*, *o*, in the centre division, and *p*, *p*, in the outer division. It will be seen that the three throw crank has four supporting bearings, the inner of which *s*, is fixed to the vessel's side, the outer one *b*, is carried on the frame work of the paddle box, and the two intermediate ones *t*, and *v*, on the stays or longitudinal bars *d*, which are fixed fore and aft to the transverse beams *w*, *w*, or to the frame work of the paddle box, each crank or division of the triple crank carries a paddle or set of paddles; which, with the carriage, works within the arms of the said crank or division of the triple crank.

It will be seen by this drawing, that the bar or beam *h*, extends from the side of the vessel at one end, and is fixed to or in the outer frame of the paddle box at the other end. The circle of motion described by the triple crank is equally divided between each division thereof, so that they nearly balance each other on their mutual and general centre.

This apparatus being driven by the power of steam or any other first mover, causes the three throw crank to revolve, and the paddles in passing through the water to propel the vessel forward.—[*Inrolled June*, 1828.]

To JOHN CHARES SCHWIESO, *of Regent Street, in the County of Middlesex, Musical Instrument Maker, for his Invention of Improvements on certain stringed Musical Instruments.*—[Sealed 22nd August, 1826.]

THESE improvements consist of three particulars. 1st, Connecting each of the tension forks, in the head of a harp which act upon the *natural* strings to springs placed over the top, for the purpose of steadying the forks, and keeping them from jarring when the strings are touched. 2nd, Attaching springs to the back parts of the axles or pins of the forks, which belong to the *sharp* strings, in order to press them to open, and operate against the pedal action. 3rdly, Placing screws in a frame in any situation between the ends of the strings, and the first bridge of a piano-forte or other such instrument, which screws are intended to act upon the strings for the purpose of regulating the tension, that is tuning with very minute accuracy.

The methods of adapting these contrivances, and their forms, may of course be varied according to circumstances, it is therefore unnecessary to exhibit figures representing them, as the intention must be obvious, and the particular mode of carrying it into effect, would in a great measure be subject to the judgment of the workmen.

By these means the patentee considers the tones of such harps, piano-fortes, and other stringed musical instruments, as the contrivances may be adapted to, will be greatly improved. Other advantages will also arise which are not explained.—[*Inrolled February*, 1827.]

To PETER MACKAY, *of Great Union Street, Borough Road, in the County of Surrey, Gentleman, in consequence of a communication made to him by a foreigner residing abroad, for an Invention of certain Improvements by which the names of Streets, and other inscriptions will be rendered more durable and conspicuous.* [Sealed 13th December, 1826.]

THE subject of this patent is enamelling letters on glass, which being put together, and made fast in a frame, are to be employed for out of doors inscriptions, such as the names of streets, in situations exposed to the weather.

The method of making the letters as proposed by the patentee, is this:—Take pieces of common window glass, and having carefully cleaned their surfaces, paint upon them the required letters in enamel colour, using if necessary a drawing at the back of the glass, or a metal letter as a pattern. If, by the spreading of the colour, the shape of the letter when so painted is inaccurate, that is, too thick in parts, the paint must be carefully scraped off from the glass in those parts, and the glass wiped very clean.

The painted glass may then be burned or baked in an oven as usual, to fix the enamel, and must be allowed to remain in the oven or kiln until cold, when the back of the glass must be varnished or otherwise covered with a dark coloured material, in order to render the white letter conspicuous.

The pieces of glass with the letters so prepared being now cut square, may be put together in a slight iron frame, and formed into words, the letters being secured therein by means of cement or mastic.

Names or other inscriptions so formed being fixed up

at the corners of streets, will be found to be very much more conspicuous and durable than those painted in the ordinary way.

The patentee observes, that he is aware letters have been enamelled on glass before, but claims as his invention the employment of such enamelled letters for the inscriptions at the corners of streets, and other exposed situations.—[*Inrolled June*, 1827.]

To JOSEPH CLISELD DANIELL, *of Stoke, in the County of Wilts, Clothier, for his Invention of certain Improvements in Preparing Wire Cards, for Dressing Woollen and other Cloths.* [Sealed 8th June, 1828.]

THIS improvement in wire cards is designed to render them more fit for the dressing of cloths than wire cards of the ordinary kind, the patentee proposing to employ them in the gig machinery as a substitute for teasles.

The wires for making these improved cards, are of two kinds; first, slender wires with sharp hooked points standing out for the purpose of penetrating into the cloth as it passes, and drawing out the fine ends of wool which are to constitute the pile: second, a stiffer sort of wire with blunt points standing a little below the former which are designed to protect the cloth, and prevent its surface being too much disturbed and injured under the operation of the machine.

The ordinary construction of wire cards are so well understood that the above description it is presumed will be perfectly intelligible, it is only necessary to add that the same improved cards are proposed to be employed for hand dressing, as well as adapted to the gig barrel, and in that case, it is advisable to place three or four rows of the

stiff protecting wires in the front part of the card to prevent the points penetrating too far into the cloth.—[*Inrolled December*, 1827.]

To Joseph Frederick Ledsom, *of Birmingham, in the County of Warwick, Merchant, for his having Invented an improvement for Purifying Coal Gas, by means not hitherto used for that purpose.*—[Sealed 2nd March, 1827.]

In the thirteenth Volume of the first series of our Journal, we gave a sketch of the process proposed to be employed by the patentee in purifying coal gas; we have now the Specification before us, and therefore are enabled to describe the improvement with more exactness.

A quantity of the ammonical liquor obtained from distillation of coal is to be converted into muriate of ammonia by saturating it with muriatic acid. When this has been done, the liquor is to be evaporated, and the salt reduced to a state of crystallization. The crystals are then to be dissolved in water, and lime added to the liquor, in the proportion of fifty pounds of lime to one hundred pounds of muriate of ammonia.

The gas passed off from the retort in the process of distillation having been conducted through water for the purpose of cooling it, and separating the tar, is now to be passed through this liquor, when the sulphuretted hydrogen which it contains uniting with the ammonia, for which it has a great affinity, becomes soluble in the water, and remains principally in the purifyer.

But if any portion of the sulphuretted hydrogen happens to pass over, it is arrested by another vessel of water containing the mixture above described.

When the muriate of ammonia in the liquor has become spent, the liquor is to be drawn off from the purifier, and

a fresh supply introduced, and the spent liquor may be restored by another quantity of muriatic acid.

The patentee says, that he sometimes employs sulphate of ammonia, which may be made by saturating the liquor with sulphuric acid, or by gypsum, and when sulphate of ammonia is used, it is necessary to add to it magnesian lime instead of common lime, by which means after the liquor is taken from the purifyer, beside ammonia, a quantity of sulphate of magnesia is obtained.—[*Inrolled September*, 1827.]

To JOHN GEORGE CHRIST, *of the Old City Chambers, Bishopgate Street Within, in the City of London, Gentleman, in consequence of a communication made to him by a certain Foreigner residing Abroad, for certain Improvements in copper and other Plate Printing.*---[Sealed 14th February, 1827.]

THIS is a contrivance by which the impressions taken from copper-plates upon paper or card are made to resemble enamel. The paper is to be prepared with a coating of white lead mixed with size made from parchment cuttings, isinglass, and gum-arabic.

The size being prepared, a quantity of white lead finely ground is to be mixed with it, when the size is in a milk warm state, and the composition being about as thick as new milk, is to be laid on the face of the paper or card with a brush.

It will be necessary to lay several coats of the composition upon the paper or card, in order to give a substance, and between each coat the material must be allowed to dry perfectly.

The prepared papers or cards are then ready to be printed in the ordinary way, and will receive a much more per-

feet impression of the plate, than paper without such preperation could do, and after the printing ink has become hard, the printed papers or cards are to be passed several times through a roller press, with a cast iron bed, the face of the print being laid upon a plate of polished steel, which operation gives a finishing glazing to the paper or card.

If it is required that the papers or cards should be tinted the colour must be ground with the white lead before mixing with the size, and in printing with gold, silver, or colours, the same mode of mixing those materials, as a printing ink, must be resorted to, as is usually adopted in printing in colours.—[*Inrolled August*, 1827.]

New Scientific Books.

Mexican Illustrations for 1825, 1826, *and* 1827. *By* M. Beaufoy. 1 *vol.* 8*vo.*

This is a book of considerable merit in a scientific point of view, though its numerous details of a country that may not unaptly be called "the schemer's purgatory," can hardly find a place in our pages. We notice it principally to furnish our readers with a condensed account of Mexican mining, which is usually but little understood. The veins of silver were no doubt originally discovered by fires being accidentally lighted on spots where the ore "cropped out" on the surface; and some portion of metal thus became smelted and seen; adventurers then began to sink a shaft; or, much more commonly, to dig a hole in the vein itself, following the richer lodes in all their sinuosities, groping about, sometimes above, sometimes below, but leaving nothing behind that was worth taking away.

If the shaft is perpendicular, a large wooden drum, turned by horses, raises the ore to the surface in a sort of sack made of three great skins, and filled with water; for the use and mode of making tubs with staves is utterly unknown, and there are very few mines which have a level depth enough to drain a third part of their galleries. While this is going forward, the carriers work their way to the surface by means of notched poles put across a part of the shaft in a zigzag direction, and they then give their load to the breakers, who knock the ore into pieces, exactly as if they were going to macadamize a road.

The quantity brought "to grass" by each individual would appear ridiculously small to to those who are unacquainted with the difficulties of the low under-ground passages, and the fatigue of mounting several hundred feet of notched sticks; but it is the long-established usage of the natives, and can only be got rid of by degrees, even in those mines where the shafts will allow a bucket.

At the manufactory, the ore is ground, or else pounded very fine under stampers, and then placed in a large open space, most frequently open to the weather, but preferable if covered from the rain and cold; it is there wetted, and mixed with certain proportions of salt and burnt pyrites, which vary in quantity on every occasion, and can only be known by long experience. This mud, which strongly resembles the scrapings of London Streets, is well trodden and mixed together by men or horses; quicksilver is then squeezed through a fine cloth all over the heap, and the mass is again turned over, and kicked about for a long succession of days. Thus, according to circumstances, the state of the atmosphere, and various other causes, the mud remains from three to six weeks before it is fit to be washed; then it is put into a cistern of water, well stirred up, and allowed to run very gently down a long

inclined plane or trough. The quicksilver having united itself with the minute particles of precious metal, they are together heavy enough to sink, and collect at the stops on the board, while the refuse dirt is carried off with the water. As the great mass of native Mexican mine proprietors have not manufactories of their own, they are obliged to send there ore to be amalgamated by other persons, paying them a fixed sum for a given quantity, and all additional expenses of salt, pyrites, and mercury.

Novel Inventions.

Improved Washing Machine, by Mr. Fryer.

[This article came too late for insertion amongst the Original Communications.]

Gentlemen,—The favourable reception which my former communication met with from you, has encouraged me to offer for publication a description of another very important improvement or invention by me, of a valuable domestic machine for the purpose of washing every kind of linen, of greater and more extensive use in my opinion, than any other machine of the kind in the world. I am aware that several machines have been constructed for the purpose of more expeditiously washing of linen, but either through the hard labour required to work them, or their damaging the linen by their improper construction, they have proved of very little benefit to the public. Another great deficiency in these machines is their not being adapted to wash different kinds of linen at the same time, which together with the above objections have created so great a prejudice against all machinery for washing of

linen, that it would seem little short of a miracle is necessary to counteract this deep rooted prejudice, and supersede the long antiquated custom of rubbing the cloth to pieces by the hands.

My machine, as annexed, consists of two separate compartments, placed side by side, nearly close to each other; in the centre of each is fixed a paddle running freely on brass bearings. Exactly over the space between, the two compartments is an arbor of cast iron, at the one end of which is fixed a pinion of 12 cogs, and furnished with a fly wheel; at the other end is a handle by which the machine is turned; exactly over this bar is a double crank with a wheel of 30 cogs, which is acted upon by the small pinion. From the crank to the paddle post are attached link bars, which give motion to the paddles, which alternately press from side to side, forcing the water through the linen and over the top of the paddle, like a water-fall, dashing down upon the linen which have just been pressed, thus alternately moving from side to side at the rate of from 25 to 30 times a minute. The crank is so constructed that the two paddles cannot press at the same time. To this machine may be attached as many other compartments as may be required to such large establishments, or to wash fine linen and coarse coloured linen and flannels all at the same time. By this means one person can wash from 10 to 100 shirts in half an hour, they being first soaped and put into the machine with the water (the soap-

ing of which may be done in 3 or 4 minutes to each shirt) or the same proportion of any other kind of linen whatever. Many other advantages might be here enumerated, such as its portability and compactness, and the extreme lightness with which it works. It may be turned by any boy or unexperienced person, and the linen cannot in this as in other machines, be slighted, for if the handle is turned round, the linen must have its proper degree of pressure, and the linen so far from not being got clean as is generally supposed, will never want even seconding; and further, that if the linen is rinced in two waters, even the boiling may be dispensed with, and the linen, notwithstanding be of a better colour than when washed by the hands, as is respectfully attested by several disinterested persons, who, I am proud to say, have honoured me with their patronage and approbation.*

Yours, &c. R. FRYER.

18, *Pilfield Street, Hoxton.*

New Royal Filter.

THIS ingenious and simple apparatus is now exciting universal attention.

The following will stand conspicuous among its advantages. 1st, its moderate price, which renders it attainable by all classes of society; 2nd, the rapidity and perfection of the process of filtration; and, 3d, because families will not be left at the mercy of their servants, who, frequently (to avoid the trouble of repeatedly charging a Filter,) would employ the unfiltered water in the culinary

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* We have seen a series of written communications to Mr. Fryer, from persons who have purchased the machine, all speaking in the highest terms of its utility.—EDITORS.

department, to which may be added, the absolute impossibility of any inconvenience arising from the accidental omission of charging the filter, which repeatedly happens in those of the ordinary construction.

The materials employed in the construction of this filter are, sand, charcoal, and large masses of silica, and in this respect it does not differ very materially from the filters usually constructed; but in the arrangement of the box intended to receive the materials, a very great and important improvement is effected.

The value of some such apparatus as the above, will be at once apparent to any person who has perused the account of the water supplied to this metropolis, and we need only inform our readers that the proprietors are Messrs. Robins and Company of the Strand.

Vazies Steam Boilers.

The application of science to domestic economy, has hitherto formed a distinguished feature in our Journal, and as honest chroniclers of the progress of useful knowledge, we feel it our duty to call public attention to this very unassuming but useful piece of culinary apparatus. We can estimate its value by the best of all tests, actual experience, and have no hesitation in recommending it to our readers, in those cases where the larger and more expensive steam boilers for kitchens are not resorted to.

Polytechnic and Scientific Intelligence.

ASTRONOMICAL SOCIETY OF LONDON.

May 9th. A paper was read before the Society, entitled " Approximate places of double stars in the South-

ern Hemisphere, for 1827, as observed at Paramatta, N. S. Wales. By Mr. James Dunlop."

After the departure of Sir T. M. Brisbane from the Colony of New South Wales, the author, finding himself in the possession of reflecting telescopes capable of adding considerably to our knowledge of the nebulæ and double stars of that portion, resolved to remain, for the purpose of making a general survey of the heavens, from the south pole to 30° of south declination. The dark nights in the absence of the moon were devoted to observations of the nebulæ, and the moonlight to those of double stars, of which however only a part could be subjected to exact micrometrical measurement. The apparatus employed for this purpose consisted of a 46-inch achromatic telescope, equatorially mounted, and furnished with two micrometers;—one a parallel line micrometer, the author's own workmanship; the other, a double image micrometer, on Amici's principle. Those which could not be micrometrically measured, had their positions and distances noted by estimation while passing the field of the 9-feet reflector, with which they were discovered in the sweeps for nebulæ, and their places are given as determined in the sweeps.

The author prefaces his catalogue with the details of the micrometrical measures of about 30 principal Southern double stars, the most remarkable of which are α *Crucis* and α *Centauri*, the former bearing a great resemblance, both in the magnitudes and the mutual distance of its individuals, to *Castor*; the latter being a star of the first magnitude, accompanied by one of the fourth, at about 20" distance—a remarkable combination, such as does not occur in our hemisphere.

A catalogue of 254 double stars arranged in order of right ascension follows, in which the right ascension to

seconds of time, and declination to the nearest minute of space,—the position, quadrant distance, the differences of right ascension and declination when observed, and the magnitudes, are set down in separate columns. They comprise double stars of all classes and of every variety. One very remarkable is the star 1 k *Argus*, AR $8^h\ 4^m$, declin. 42° 7', which consist of individuals of the sixth and eighth magnitudes, the large star being blue, and the small one dusky red. This affords almost the only instance known of a combination of two considerably bright stars differing decidedly in magnitudes, where a marked excess of the less refrangible rays enters into the composition of the light of the smaller star, and of the more refrangible into that of the larger. Among the double stars is set down also one of the seventh magnitude, right ascension $1^h\ 19^m\ 43^s$, declin. 33° 31', of that singular deep red purple colour of which examples are not wanting in our own hemisphere.

An extract of a letter was read from Professor Harding, of Gottingen, to Dr. Tiarks, in which he alludes to a phænomenon that had recently been observed by several astronomers on the continent, relative to an inequality of the dark space between the body of Saturn and its ring. This appearance was first noticed by M. Schwabe on December 21, 1827, and has since been confirmed by several persons to whom M. Harding had communicated the circumstance. It seems that the space on the eastern side of the planet appears larger than the space on the western side. M. Harding was at first inclined to treat the whole as an optical deception, till the fact was confirmed by others, when he was induced to attempt an explanation of the phænomenon. He endeavoured to account for it by the present position of Saturn, but the result of his calculation proved that that cause

would not increase the space (in March) more than $\frac{1}{88}$; a quantity probably too small to become perceptible to the eye. He indeed imagined that the appearance might be caused by the shadow of the body, which at present falls much beyond the south-eastern part of the ring, and which might render it impossible to perceive the equality of the two spaces. But this, he says, is disproved by the observation of M. Schwabe, who saw the same phenomenon on the 31st December, three weeks before the opposition, when the shadow was on the western side, and could be but faintly discerned. M. Harding is unable to explain it as an optical deception, and yet cannot consider it in any other light at present. Actual measurement, he says, can alone decide the question. He has already written to M. Struve to take some measures with his powerful telescope, and he requests that this communication may, with the the same view, be forwarded to Messrs. Herschel and South, who have the best means, in this country, of determining this singular phænomenon.

Mr. South then read a note, which he had annexed to the above communication, stating, that in compliance with M. Harding's wishes, Mr. Herschel and himself had directed their attention to Saturn, but that they did not detect any inequality in the two spaces above alluded to, by means of micrometers attached to his 5-feet equatorial. The mean of 25 measures, taken on April 26, April 29, and May 8, gave the preceding (or western) space 3″·532; and the following (or eastern) space 3″·607. At the same time he remarks that the mean of 20 measures taken on April 26 (viz. 10 by Mr. Herschel and 10 by himself) gave the spaces precisely the same, each being 3″·472. Mr. Herschel's measures gave the preceding (or western) space 3″·612; and the following (or eastern) space 3″·442

whilst his own gave the former 3″·331, and the latter 3″·502. Mr. South adds, however, that Mr. Herschel, after a careful examination, thought that, beyond all doubt, the following (or eastern) space appeared the larger: and it is a remarkable fact, that of seven persons who were present in Mr. South's observatory, shortly afterwards, and who successively viewed Saturn through his 5-feet equatorial, six of them gave it as their opinion that the apparent right (or eastern) space was the larger: whilst the observer declared he could not distinguish any difference. The situation, however, of Saturn was so low, as to render most of these observations far from satisfactory.

M. Harding also alludes in his letter to the re-appearance of the variable star in the constellation *Serpens*, mentioned in No. 5, of the Society's monthly notices. He says, it is now again become visible, and has already attained the 8th or 9th magnitude. Its position for the beginning of this year is

$$AR = 15^h\, 46^m\, 45^s \quad \text{Decl.} = +\ 15^\circ\, 39'\, 30''$$

and he invites astronomers to watch this star during this period of its changes.

A communication was then read from Mr. Rumker of the observatory at Paramatta in New South Wales, giving an account of his observations for determining the absolute length of the pendulum vibrating seconds there, according to Borda's method. The apparatus with which these experiments were made, was constructed by Fortin, of Paris, and taken out to the colony by Sir Thomas Brisbane. There are some slight alterations from the apparatus described by M. Biot, which are pointed out by Mr. Rumker: and he also alludes to a new method of observing the coincidences. In Borda's method the coincidence is determined by the intersection of the wire of

the pendulum of experiment with a cross marked on the bob of the pendulum of the clock. In lieu of this cross, Mr. Rumker placed a small graduated ark, and the determination of the coincidence resolves itself into observing the moment when the wire describes its minimum amplitude on the arc. Mr. Rumker likewise adopts a new mode of determining the correction for the arc of vibration, he finds that in large arcs (such as 8 or 9 degrees, to which his arcs sometimes extend) the decrease is not in a geometrical progression. When the times are in arithmetical progression. He has therefore formed a table of the actual decrease of the arcs as observed by himself, at equal intervals of five minutes each; and given the corresponding corrections for each interval. In the course of his reductions he notices some errors in the formula given by M. Biot for finding the centre of oscillation of a pendulum constructed according to the methods of Borda. The mean of 41 series of experiments gives the length of the pendulum, vibrating seconds in Paramatta, *in vacuo*, at the freezing point, and at the level of the sea, equal to 992·412801 millimetres, or 30·071618 English inches.

Water Companies.

The supply of water for domestic purposes is too important a subject to be passed over lightly by those who regard the medical police of the metropolis. The report that has just been furnished by the Parliamentary Commissioners is however too extensive for our pages, and we must content ourselves with a review of the most important features.

For the whole population on both sides of the Thames there are eight water companies, all of whom, with the exception of two, take their supply from the Thames,

though under different circumstances, some of them taking it up more, and some less pure; some of them purifying it in cisterns, ere they send out to the public, and others not.

The *New River Company* gets its supply chiefly from the spring at Chadwell, between Hertford aed Ware. It comes in an open channel of about forty miles in length, to reservoirs at Clerkenwell, which, the town having now stretched completely round it, must receive a considerable quantity of charcoal, coal tar, and ammonia, from the smoke and other impurities. There are two reservoirs having between them a surface of about five acres, and an average depth of ten feet. These reservoirs are eighty four feet and a half above low water mark in the Thames, and by means of steam engines and a stand-pipe, an additional height of sixty feet can be given to the water, so that all the mains belonging to this company are kept full by a considerable pressure of water. The highest service given by the New River, is the cistern on the top of Covent Garden Theatre. The aqueduct by which the water is brought has but little fall, thus it wastes by evaporation during the draught of summer, and is impeded by frost in the winter. At these times, the company pump an additional supply from the Thames, at Broken Wharf, between the Blackfriars and Southwark bridges. To this, however, they seldom have recourse, and their engine, which they have erected only since the works at London Bridge were broken down, has worked only 176 hours in the year. The New River Company supply 66,600 houses with water ,at an average of about 1,100 hogsheads each in the year, or in all about seventy five millions of hogsheads annually.

The East London Water Works are situated at Old Ford, on the river Lea, about 3 miles from the Thames, and a little below the point to which the

tide flows up the Lea. By the act of parliament, this company must take its water when the tide runs up, and the mills below have ceased working. The water is pumped into reservoirs, and allowed to settle, and a supply of 6,000,000 gallons is daily distributed to about 42,000 houses. This Company supplies no water at a greater elevation than thirty feet, and the usual height at which the delivery is made to the tenants, is six feet above the pavement; they have 200 miles of iron pipes, which in some places cost them seven guineas a yard.

Thisand the New River are the only companies which do not draw their supply of water entirely from the Thames. The portion of Thames water drawn by the latter company with their engine at Broken Wharf, is ascertained, but there is no evidence as to the quantity of Thames water that may be in the flood-tide of the Lea, although the probability is, that there is very little, if any at all, as the damming up of the Lea is probably sufficient to produce the rise.

The West Middlesex derive their supply of water from the Thames, at the upper end of Hammersmith, about nine miles and a half above London Bridge, and were the bed of the Thames is gravel. The water is forced by engines to a reservoir at Kensington, 309 feet long, 123 wide, and 20 deep, paved and lined with bricks, and elevated about 120 feet above low water in the Thames. They have another reservoir on Little Primrose Hill, about 70 feet higher, and containing 88,000 hogsheads of water, under the pressure of which the pipes are kept charged, in case of fires. They serve about 15,000 tenants, and the average daily supply is about 2,250,000 gallons.

The *Chelsea Water Works* derive their supply from the Thames about a quarter of a mile east of Chelsea Hospital, and they have two reservoirs, one in the Green Park, and another in Hyde Park; the former having an eleva-

tion of 44 feet, and the latter of 70. These reservoirs have never been cleaned, nor is any preparation made for that purpose in their construction. About one third of the water served out by this company is allowed to settle in these reservoirs, and the remaining two thirds are sent directly from the Thames. Latterly, however, the company have been making preparations for filtering the water, and also for allowing it to settle in reservoirs at Chelsea, before it is delivered in the mains. The Chelsea company serve about 12,400 houses, and the average daily supply is 1,760,000 gallons.

The *Grand Junction Company* derive the whole of their supply from the Thames immediately adjoining Chelsea Hospital; thence it is pumped without any fultration or settling, into three reservoirs at Paddington. These reservoirs are about 71, 86, and 92 feet above the high water mark in the Thames; their united contents is 19,355,840 gallons; and by means of a stand-pipe, the water is forced to the height of 147 feet, or about 61 feet above the average reservoir; the number of houses supplied by the Grand Junction Company is 7,700, and the average daily supply is about 2,800,000 gallons. These five companies supply the whole of London and its environs north of the Thames; while the buildings and works south of the river are supplied by the three following:—

The *Lambeth Company* takes its supply from the Thames between Westminster and Waterloo Bridges. It is drawn from the bed of the river by a suction pipe, and delivered to the tenants without being allowed to subside,—there being only a cistern of 400 barrels at the works, as a temporary supply, until the engines can be started. The greatest height to which this company forces water is about 40 feet, the number of houses they supply is 16,000, and the average service is 1,224,000 gallons daily.

The *South London,* or Vauxhall Company take their supply from the river Thames, by a tunnel, which is laid 6 feet below low water mark, and as far into the river as the third arch of Vauxhall bridge. At that particular place, the bed of the Thames is described as being always clean, and without any of those depositations of mud, and more offensive substances that are found in many other places. Besides the greater purity of the bed of the Thames here than were any other company on the south side takes its supply, the company allow the water to settle in reservoirs. The Vauxhall company supply about 10,000 houses with about 1,000,000 gallons of water daily.

The Southwark Water Works are supplied from the middle of the Thames below Southwark and London Bridges, and the water thus taken is sent out to the tenants without standing to settle or any filtration, further than what it receives from passing through wire grates, and small holes in metallic plates. The number of houses supplied by these works is about 7,000, and the average daily supply about 720,000 gallons.

The elements of this supply will be better understood, by collecting the results into a table as follows:

Companies.	*Services.*	*Average per Day Gallons.*	*Gallons annually.*	*Aver. per h*
1. New River	67,000	13,000,000	4,056,000,000	182
2. East London	42,000	6,000,000	1,872,000,000	143
3. West Midx.	15,000	2,250,000	702,000,000	150
4. Chelsea	12,400	1,760,000	549,120,000	142
5. Grand Junct.	7,700	2,800,000	873,600,000	363
6. Lambeth	16,000	1,244,000	388,128,000	77
7. South Lond.	10,000	1,000,000	312,000,000	100
8. Southwark	7,000	720,000	224,540,000	102
Total	183,100	28,774,000	9,977,388,000	157

Average per house, north of the river 196 gallons.
Average ditto . . south . . . . 93 gallons.

From this table, it appears that the average supply per house, is more than twice as much on the Middlesex side of the Thames as on the Surrey side, and that the district supplied by the Lambeth Works, does not receive one fifth the quantity which is supplied by the Grand Junction. It is true that in many places of that district, the houses are much smaller than in the other, and it is also true, that not so much is consumed in watering the streets, the supply for that purpose being in some cases taken directly from the Thames, and the watering very imperfectly done in others, but still as the population is very dense, it is possible that these small houses contain upon the average as many human beings each, as the largest houses in other districts. Hence it should seem that either the one district, has an over supply, or that the other has not enough. In cases of fire, too, frequent and serious complaints have been made of the damage that has ensued, from the delay and difficulty of obtaining water. For this latter purpose, it does not appear from the evidence, more especially in the case of the Lambeth works, that there is a sufficient pressure from a head water upon the mains, and we have observed that the plugs are not so often drawn for the purpose of cleaning the pipes on the south side of the river as they are on the north. (The chemical analysis will appear in our next Journal.)

SOCIETY

FOR THE ENCOURAGEMENT OF

Arts, Manufactures, and Commerce.

Adelphi, 2nd June, 1828.

THE Rewards adjudged by the Society, during the past Session, were this day presented to the respective Candidates, by The Right Hon. THE EARL OF RADNOR, VICE PRESIDENT, at the King's Theatre, in the Haymarket, in the following Order: —

In Agriculture.

To Lord Newborough, for planting above 3,700,000 forest trees on his estates in Caernarvonshire and Denbighshire, the large Gold Medal.

To Joseph Houlton, Esq Grove Place, Lisson Grove, for introducing the roots of stachys palustris as an esculent vegetable, the Silver Ceres Medal.

In Chemistry.

To Mr. George Jackson, 30, Church-street, Spitalfields, for his apparatus for instantaneous light, the Silver Isis Medal.

To Mr. T. Cogan, 399, Rotherhithe Wall, for his method of purifying linseed and rape oils, the Silver Isis Medal and £10.

In Mechanics.

To Mr. L. Hebert, 19, Queen-street, Chelsea, for his prepared plumbago to be used instead of oil for chronometers, the Gold Isis Medal.

To Mr. W. Melvine, 22, Ironmonger Lane, Cheapside, for his detached escapement for chronometers, the large Silver Medal.

To Mr. T. Judge, New End, Hampstead, for his self-adjusting pendulum, the large silver medal and £5.

To Mr. R. May, New Road, Deptford, for his watch-escapement, the large silver medal and £5.

To C. H. Ackerley, Lieut. R. N. Plymouth, for his safety rods for ships' boats, the large Silver Medal.

To J. Higgins, Esq. 370, Oxford-street, for his revolving lights for steam-boats, the large silver medal.

To H. W. Hood, Esq. Commr. R. N. for his floating bridge to communicate between a ship and the shore, the large silver medal.

To Mr. J. Castell, 44, Dartmouth-street, for his improved cock for bottling wine, the large silver medal.

To Mr. T. Chapman, 4, Royal-row, Lambeth, for his carriage for Mr Palmer's railway, the Silver Isis Medal and £5.

To Mr. Al. Bain, 7, Broad Court, Long Acre, for his moveable stamps for bookbinders, the Silver Isis Medal and £5.

To Mr. W. Hilton, 10, Regent-street, Pall Mall, for his ladder cane, the large Silver Medal.

To Mr. Jas. Dowie, and Mr. Al. Black, Edinburgh, for their improved machine for the use of boot and shoe makers, two Silver Isis Medals.

To Mr. R. Mottershead, for his expanding piston for high pressure steam-engines, the large silver medal and £20.

To Mr. T. E. Bonner, 38, Tabernacle Walk, Finsbury, for his door lock, the Silver Isis Medal.

To Mr. Jos. Clement, 21, Prospect-place, Southwark, for his improved turning lathe, the Gold Isis Medal.

To Mr. And. Smith, 2, Palace-street, Pimlico, for his lever cramp, the Silver Isis Medal.

To J. P. Holmes, Esq. 21, Old Fish Street, Doctor's Commons, for his obstetrical instruments, the large Gold Medal.

To Mr. C. Gibson, 71, Bishopgate-within, for his spoon for administering medicine, the Silver Isis Medal.

In Polite Arts.---Honorary Class.—Copies.

To Mr. Al. Beaumont, County Fire Office, Regent-street, for a copy in pen and ink of figures, the Silver Isis Medal.

To Mr. W. Price, 46, Warren-street, Fitzroy Square, for a copy in chalk of a head, the Silver Palette.

To Mr. T. Underwood, Colemore, near Birmingham, for a copy in pencil of a landscape, the Silver Isis Medal.

To Mr. R. Finlayson, 45, Upper Baker-street, for a copy in water colours of an historical subject, the large Silver Medal.

To Miss F Burnell, 14, Park-square, Regent's Park, for a copy in chalk of a head, the Silver Palette.

To Miss M. H.Crutwell, 59, Stafford-place, Pimlico, for a copy in chalk of head, the Silver Isis Medal.

To Miss Wiggins, 130, Piccadilly, for a copy in Indian Ink of a landscape, the Silver Isis Medal.

To Miss L. Welby, 100, Guildford-street, for a copy in pencil of a landscape, the Silver Palette.

To Miss L. Corboux, 5, Hercules Buildings, Lambeth, for a copy in chalk of an historical subject, the silver Isis Medal.

To Miss E. Blair, 39, Welbeck-street, for a copy in chalk of an historical subject, the large Silver Medal.

To Miss J. W. Leith, 32, Kenton-street, Brunswick-square, for a copy of a portrait in miniature, the silver Palette.

To Miss B. S. Wiggins, 130, Piccadilly, for a copy in water colours of a landscape, the large Silver medal.

To Miss E. Parker, 19, Great Newport-street, for a copy in water colours of a landscape, the silver Isis medal.

To Miss J. W. Hurlstone, 52, Sloane-street, for a copy of flowers in water colours, the large silver medal.

To Miss Lester, 10, Elm-street, Gray's-Inn-Lane, for a copy of flowers in water colours, the Silver Isis Medal.

To Mr. J. W. Moore, 6, Argyll-street, for a copy in pencil of an animal, the Silver Isis Medal.

To Miss Murray, 72, Euston-square, for a copy in oil of a landscape, the large Silver Medal.

To Miss E. A. Dyer, Didmaston, Gloucestershire, for a copy of an historical miniature, the Silver Isis Medal.

Drawings from Busts.

To Miss M. A. Williams, 12, Charlotte-street, Bloomsbury, for a drawing in chalk from a bust, the Silver Palette.

To Miss J. Eggbrecht, 16, Frith-street, Soho, for a drawing in chalk from a bust, the Silver Palette.

Original.

To Miss E. F. Haworth, Barham-wood, Elstree, Herts, for an original historical miniature, the Gold Isis Medal.

To Miss M. Jones, 8, Coleman-street, for an original portrait in miniature, the Gold Isis Medal.

To Miss Mintorn, Woodfield Cottage, Bristol, for an original portrait in miniature, the large Silver Medal.

To Miss Witts, 8, Brunswick-square, for an etching of an animal, the large Silver medal.

To Mrs. Jos. Stannard, St. Giles's, Norwich, for an original oil-painting of dead game, the Gold Isis Medal.

Artists.—Copies.

To Miss Chapman, 106, Great Russell Street, for a copy in water colours of figures, the large Silver Medal.

To Mr. J. H. P. Stubbs, 28, Allsop's-buildings, New-road, for a copy of figures in pen and ink, the Silver Palette.

To Mr. J. Pasmore, 6, Salisbury-court, Fleet-street, for a copy in pencil of a head, the Silver Palette.

To Miss F. Riviere, 8, Cirencester-place, Fitzroy-square, for a copy in chalk of figures, the Silver Isis Medal.

To Mr. Jas. Walsh, 11, New Burlington-street, for a copy in water-colours of figures, the Silver Isis Medal.

To Miss Eliz. Setchell, 23, King-street, Covent Garden, for a copy in chalk of a head, the Silver Isis Medal.

To Miss L. Lyon, 22, Nassau-street, Cavendish-square, for a copy in miniature of a portrait, the large Silver Medal.

To Mr. J. Peake, 26, Clarendon-street, Somers-town, for a copy in Pen and ink of a landscape, the Silver Palette.

To Miss L. Derby, 12, Osnaburgh-street, Portland-place, for a copy in pencil of a landscape, the Silver Isis Medal.

To Miss E. Crabb, Point Pleasant, Wandsworth, for a copy in water colours of a landscape, the Silver Palette.

To Mr. C. F. Du Pasquier, St. James's Palace, for a copy in pencil of animals, the Silver Isis Medal.

To Mr. R. Shaw, 20, Hemmings Row, St. Martin's Lane, for a copy in pencil of animals, the Silver Palette.

Drawings and Paintings from Busts and Statues.

To Mr. E. U. Eddis, 1, Barnsbury-street, Islington, for a drawing in chalk from a bust, the large Silver Medal.

To Mr. C. G. Hill, Queen-street, Golden-square, for a drawing in chalk from a bust, the Silver Isis Medal.

To Mr. J. White, 14, Brownlow-street, Holborn, for a painting from a bust, the large Silver Medal.

To Miss C. Derby, 12, Osnaburgh-street, Portland-place, for a painting in oil from a bust, the Silver Isis Medal.

To Mr. C. W. Cope, 45, Clarendon-square, Somers-town, for a finished drawing from a statue, the large Silver Medal.

To Mr. A. H. Taylor, 3, Lower Stamford-street, Blackfriars, for a finished drawing from a statue, the Silver Palette.

Original.

To Mr. Ed. Hassell, 12, Upper Belgrave-place, Pimlico, for a painting in oil of the altar-piece of St. Margaret's Church, the Silver Palette.

To Mr. A. R. Slous, 6, Bayham-street, Camden-town, for an original historical composition in water-colours, the large Silver Medal.

To Mr. J. W. Solomon, 8, King-street, Covent-garden, for an original historical composition in oil, the large Silver Medal.

To Mr. D. Pasmore, 6, Salisbury-court, Fleet street, for an original group of portraits in miniature, the Gold Isis Medal.

To Miss L. J. Green, 8, South Crescent, Bedford-square, for an original portrait in miniature, the Gold Isis Medal.

To Miss Alabaster, 58, Piccadilly, for an original portrait in oil, the Gold Isis Medal.

To Mr. Jas. Y. Gant, 54, Greek-street, Soho, for an original portrait in oil, the large Silver Medal.
To Mr. W. H. Freeman, 2, Stanhope-street, Clare Market, for an original landscape in oil, the large Silver Medal.
To Mr. C Marshall, 24, Everett-street, Brunswick-square, for an original landscape in oil, the Gold Isis Medal.
To Mr. W. R. Patterson, 2, Broadway, Westminster, for an original marine painting in oil, the large Silver Medal.
To Mr. A. G. Vickers, 8, Barton-street, Westminster, for an original marine painting in oil, the Gold Isis Medal.
To Mr. W A. Crabb, Point Pleasant, Wandsworth, for an original oil painting of flowers, the large Silver Medal.
To Miss L. A. Shaw, Stonehouse, Plymouth, for an original painting in oil of fruit and flowers, the Gold Isis Medal.
To Mr. L. Wells, 2, Stanhope-street, Clare Market, for an original oil painting of still life, the large Silver Medal.
To Mr. E. Lee, 26, Newland-street, Kensington, for an original historical composition in Indian Ink, the Silver Isis Medal.

Models and Carvings.

To Mr. J. Mason, Twickenham, for a model of a bust from life, the large Silver Medal.
To Mr. H. Hogan, 12, Park-street, Dorset-square, for a copy in plaster of an architectural ornament, the large Silver Medal.
To Mr. H. Bailes, 434, Oxford-street, for an original group of figures carved in wood, the large Silver Medal.
* To Mr. S. Briant, 34, Monmouth-street, for his model of St. Clement's Church, the Silver Isis medal and £5.

Architecture.

To Mr. R. Stokes, 29, Lower Brook-street, Grosvenor-square, for a drawing in perspective from a Corinthian capital, the large Silver Medal.
To Mr. R. Garland, 13, Gray's-Inn Terrace, for a drawing in perspective from a Corinthian capital, the Silver Isis Medal.
To Mr. T. J. Kilpin, 6, Orchard-place, Kingsland-road, for an original design for a Gothic Cathedral, the large Silver Medal.

Gem Engraving.

To Mr. C. Durham, 17, Arundel-street, Strand, for an engraving in intaglio of a head, the Gold Isis Medal.

Engraving on Wood.

To Mr. M. M. Hart, 31, Gerrard-street, Soho, for engravings on wood, the large Silver Medal.

In Manufactures.

To C. T. Tower, Esq. Weald Hall, Essex, for his flock of Cashmeer Goats, and for a shawl manufactured from their wool, the large Gold Medal.
To Mr. R. Lloyd, 71, Strand, for his sheet cork, the Silver Isis Medal.

In Colonies and Trade.

To the Rev. L. Guilding, King's Town, St. Vincent's, for his communication respecting the insects which infest the sugar-cane, the Gold Ceres Medal.
To. W. Green, Esq. Quebec, for pigments, the produce of Canada, the Gold Isis Medal.
To Greg. Blaxland, Esq. Sydney, New South Wales, for wine, the produce of his vineyard in New South Wales, the Gold Ceres Medal.

List of Patents,

GRANTED BY THE FRENCH GOVERNMENT, FROM 1st JANUARY, to 31st MARCH, 1828.

Sequin, letter press printer, Paris, for manufacturing china paste boards. 5 years.

Claude Pierre Roux, jeweller and gilder, Paris, for a mechanical frame, called a *pendule*. 5 years.

Pierre Jeandeau, Knight of the Legion of Honour, Director of the Works of the Royal School of Arts and Trades, at Châlons, for a machine for throwing up a continued steam, suited for draining. 10 years.

John Nicholson, Paris, engineer, for a process, apparatus, and machinery for preparing and printing the threads of flax, cotton, silk, &c. 15 years.

Claude Jean Baptiste Alexander Berthault, Surveyor of Roads, Châlons, for a process for making a water-proof mastic. 15 years.

Victor Lemétayer, manufacturer, Fécamp, for a warping machine. 10 years.

Pierre Bouillon, junior, limoges, for a system of steam engines of all pressures, 10 years.

Auguste de Boussard, clock-maker, Toulouse, for a superior self-cleansing level lamp. 10 years.

Francois Chatelard and Petrus Perrin, steel comb makers, Lyon, for a comb of a new form, adapted to broad cloths. 5 years.

Delamnay, surgeon, Nantes, for an instrument of a particular form for midwifery. 5 years.

Jacques Nicholas Legendre, Ecquainville, for a mechanical mode of making barrells, tubs, &c. 15 years.

Jean Pierre Praget, Ais, brazier, for a still. 10 years.

William Kinner Marshal, London, for a new method of mounting cannon. 10 years.

Hemsteller and Rieger Bommer, Vassellonne, for a new method of making roads. 10 years.

Jacques Javel, junior, one of the Proprietors of the Messageries Royalis, Paris, for the construction of a carriage for transporting goods and passengers with expedition. 15 years.

Louis Aubry, merchant, Chaumont, for a machine for sowing by back-stitch and quilting, called the Métier Régulateur. 5 years.

Dumont, refiner, Paris, for a method of baking, clarifying, and filtering sugar. 10 years.

Alexander Derlin, Paris, for the application of hydrogen gas to lamps with a double current of air, serving as an impellant and burner. 15 years.

Daniel Girand, Paris, for a method of using the "filvire," invented by Caiman Duverger. 5 years.

Paul Portal & Co., Bordeaux, merchants, for a steam engine with Gurney's high pressure. 15 years.

Bertrand Fourmond, engineer, Nantes, for a printing press, with jointed movements, by means of a lever, called the *Presse Nansaise*. 5 years.

Dr. Barrier, Lavoulte, for a pneumatic hydraulic machine. 15 years.

Michel Oddo, mechanician, Marseille, for a method of preventing smoky chimneys. 5 years.

Joseph Guyon, Dole, for the construction of an economical kitchen furnace. 10 years.

Pierre Agathe Mostier and Jean Baptiste Bourgen, mechanics, St. Etienne, for a process of making wide ribbons on looms *a la Zusichoise*. 10 years.

Henri-Joseph Pohlen, Paris, for a method of taking the gloss off cloths and other stuffs. 5 years.

Jean Pierre Palissard, Escorneboeuf, for a machine called a *Tractariaterre*, for transporting earth. 5 years.

Bruno de Villeneuve and Jean Jacques Mathieu, silk manufacturers, Lyons, for a method of making watered ribbons, called *a grands effets*. 10 years.

Sequin & Co. civil engineers and manufacturers of annonay, for a steam boiler, on the principle of the warm air circulating in small isolated tubs. 10 years.

Edward Dodd, pianoforte-maker, for certain improvements. 5 years.

William Newton, London, for metallic blinds and window shutters. 5 years.

Jacques Francois Adam, Paris, for a new method of binding books. 10 years.

Jean Fayolle and Jean Baptiste Joseph Legros, brace makers, Paris, for a loom with four pedals for manufacturing several garters or braces at once. 5 years.

Antoine Jourdon, Paris, for a carriage that cannot be overturned, called *douillette d'aplont*. 5 years.

Louis Favre, Marseille, for the making of soap without fire, by means of pure artificial soda, or his salt of soda, and pure olive oil. 5 years.

Andre Millet, merchant, Paris, for a portraitive chimney. 5 years.

Gabriel Vandemerghel, brewer, Armentiers, for a method of making white beer, as at Louvain. 15 years.

Auguste Moineau, clock maker, Paris, for a movement of indestructible pressure applicable to machinery as well as clocks, called *à la moineau*. 15 years.

Jean Baptiste Barnard Maitre Humbert, Jean Baptiste Charlemagne Louis Basile, and Adiren Chenot, Chatillon sur Seine, for a process of obtaining iron with economy of fuel, without previously melting the ore or dross. 15 years.

Martial Theuvoit, innkeeper, Autun, for a machine for stretching the cords of musical instruments. 10 years.

Jean Alphonse Camme, mechanician, Malannay, for improvements in the cogs of pulleys, for sea service. 5 years.

Charles Frederic Baer, coach-builder, Strasburg, for a method of turning a carriage round short by means the fore wheels moving with hinges. 5 years.

Gautier, Nantes, for the preparative of and method of preserving butter. 5 years.

Sebastien Prefaut, turner, Nevers, for a press adapted to every purpose where pressing is required. 5 years.

Mury, Paris, for improvements in making clogs. 5 years.

Louis Jean Pierre Jomard, Valence, for a method of surveying by means of an instrument called a *tact-Graphique*. 5 years.

Michel Grand, spinner, Marseilles, for a machine called a *balancier moteur*. 5 years.

The Turf Pit Company at Crony-sur-Ourcq, for improvements in the oven preparing peat. 5 years.

Achille de Bernardière, manufacturer, Paris, for a method of making fine baskets and cane work with stripes of whalebone. 5 years.

Christophe François Martin Dillemann, manufacturer, and Jean Michel, Reinhardt, mechanic, Strasburg, for a horizontal bobbin, with vertical pressure, for spinning cotton. 10 years.

Alexis Bruno Gensoul, physician, Bagnols, for a method of warming the pans for spinning the silk cacoons with economy of fuel. 10 years.

Pierre Revon, mechanic, Paris, for a steam engine adapted to carriages and vessels of all descriptions. 10 years.

Caiman Duverger, architect, Soisy sur Etiolles, for a new syringe, called a *elysoir*. 5 years.

Etienne Lasgorsieux, mecanician for improvements in the construction of machinery for opening, and preparing, and spinning wool, silk, hemp, flax, &c. 10 years.

François, junior, and Bernoit, builders, Troyes, for a lithographic press, with cylinders. 5 years.

John Neale and Alexander Cowan, Nancy, for a method of preparing and passing cotton and thread through steam. 5 years.

Penelet, father and son, watchmakers, Paris, for an instrument called *compteur de physique and d'astronomie*. 15 years.

Louis Joseph Pellepoit, and Wm. Poupier, *née* Jeanne Antoinette Salos, Paris, for a method of rendering stuffs and paper of all colours water-proof. 5 years.

John Neale and Alexander Cowan, engineers, Nancy, for a mechanical loom which prepares its own warp. 5 years.

Antoine George, silk knit manufacturer, Lyons, for a machine for making bricks. 5 years.

Pierre Monuet, the son, brandy distiller, at Grand Gallargues, for an apparatus for distilling wines and the dregs of grapes. 10 years.

Pierre Fasanini, merchant, Lyons, for a machine for weaving stuffs of all kinds and which stops when the woof or warp breaks. 10 years.

Jean Baptiste Langlois-Quignolot, purse-maker, Paris, for a new stitch, called *point de tulle* or *point à jour*, in making purses, worked by machinery. 5 years.

Saint Maurice Cabany, merchant, Paris, for a machine for making a coating of gold or silver or any other matter with variegated colours, adapted as ornamental borders, &c. which may be pasted or glued to bronzes, pasteboard, and cabinet works, &c. 15 years.

Mathias Levi Lauzenberg, Morocco-leather manufacturer, Strasburg, for a method of separating in two the skins of calves and goats. 10 years.

Pierre Jacques Debezis, Paris, for an elastic bathing tub, called *baignoires dormeuses*. 10 years.

Pierre Gervais Emmanuel Meunier; and Guillaume Mars, sheet iron manufacturers, for sheet iron measures, for measuring corn, &c. 5 years.

Raymond de Gaston, Ex-Receiver General, Paris, for a smoke machine, adapted at a small expense, to every chimney. 5 years.

John Heathcoate, Paris, for improvements in the movement of the bobbins in making bobbin-net. 15 years.

Dominique Marie Houlet, and Silvain Riverin, button makers, Paris, for the employment of pieces and remains of whalebone, for making buttons of all colours. 5 years.

Maximin Cassagnica, Paris, for an apparatus for preparing and carbonzing peat. 10 years.

Louis Baron, merchant, Nismes, for further improvements in distilling. 10 years.

Schlumberger, father and son, Paris, for a loom for weaving flax and hemp. 5 years.

Jean Louis Jaume, Paris, for a method of baking plaster and lime, and the soil for making tiles, bricks, and slabs. 15 years.

Pierre Joseph Paret, mechanician, Montpellier, for a weighing machine. 15 years.

Auguste de Boussard, watch-maker, Toulouse, for a superior self-cleansing level lamp. 10 years.

Jean Baptiste Bailleul, chymist, Paris, for a distilling apparatus by steam for extracting the alcohol from dregs of grapes, &c. 5 years.

Lagier, merchant, and Robiquet and Colin, chemists, Paris, for a method of purifying madder. 10 years.

Ager and Co., Paris, for a machine for making matches. 5 years.

Bandin, senior, Paris, for a new method of transporting and preserving fish. 15 years.

Authoine, junior, Paris, for constructing furnaces of free stone, called *pierre de Brabantine*, or *Pierre à feu*. 5 years.

Francois Jean Guillaume Dande, Paris, for metallic loop holes in stays, dresses, &c., instead of those worked with the needle. 5 years.

Josue Heilman, Mulhausen, for a cotton spinning machine, called *lanterne bobinente*. 10 years.

Zuber and Co., painted paper manufacturers, Rixheim, for a method of printing paper by means of a hollow engraved roller, instead of by hand. 10 years.

Francois Benoit Hermier, lock-smith, Monteux, for an instrument for scythes to give them the curve. 5 years.

Francois Vallett, cloth manufacturer, Lodeye, for a bandage with elastic cushion. 5 years.

Sapy, Brothers, Beaucourt, watchmakers, &c. for a mill for strengthening, cutting and lengthening the wire intended for pins and for forming the worm of screws for wood or metal 15 years.

Pierre Bernardot, and Daubauton & Co., Paris, for making paper of animal substances, called *aporeutype.* 15 years.

Lichartier, drawing master, and Labove Delille, Cultiuator, for a machine for winnowing corn.

Matthieu Casson, billiard table maker, Paris, for a method of making the pockets of billiard tables with grooves, and other improvements. 5 years.

Paris, June 25, 1828. CHARLES ALBERT.

New Patents Sealed in 1828.

To Thomas Aspenwall, of Bishopsgate Church Yard, in the city of London, esq. in consequence of a communication made to him by a certain foreigner residing abroad, for an improved method of casting printing types, by means of a mechanical process, which invention he proposes to call the mechanical type caster—Sealed 22nd May—6 months for inrolment.

To Samuel Hall, of Basford, in the county of Nottingham, cotton manufacturer, for his having invented or found out a new method of, and an apparatus for generating steam and various gasses, to produce motive power and for other useful purposes—31st May—6 months.

To James Moffat, of King's Arms Yard, Coleman-street, in the city of London, master-mariner, for his having invented an improvement in apparatus for stopping and securing chain cables, also for weighing anchors attached to such chain or other cables, either with or without a messenger—3 June—6 months.

To Daniel Jobbins, of Uley, in the county of Gloucester, millman, for his having invented an improved method by certain machinery applicable to stocks or fulling machines of milling and scowering woollen cloths and other fabrics requiring such process—3rd June—2 months.

To Baron Charles Wetherstedt, of Commercial Place, Commercial Road, in the county of Middlesex, for his invention of a liquid or composition for water-proofing or strengthening leather—4th June—6 months.

To Richard Witty, of the township of Hanley, in the county of Stafford, engineer, for his having invented or found out certain improvements in apparatus for making and supplying coal gas for useful purposes—10th June—6 months.

To Edmond Gibson Atherley, of York Place, Portman Square, in the county of Middlesex, esq. for his having invented an apparatus for a method of generating power applicable to various purposes—12th June—6 months.

To William Stratchan, of Avon Eitha, in the parish of Ruabon, in the county of Denbigh, manufacturer, for his having invented or found out an improvement in the making or manufacturing of alum—12th June—4 months.

To John Bartlett, of Chard, in the county of Somerset, shoe thread manufacturer, for his invention of a new and improved method or methods, or manufacturing process for preparing flax, thread, or yarn for use in the manufacture of boots, shoes, sadlery, and of sails, and other cloths and bagging—16th June—2 months.

To George Johnson Young, of the town and county of Newcastle-upon-Tyne, iron founder, for his invention of a machine whereby an additional and improved purchase or power will be given in working Ships' Windlasses and capstans—21st June—6 months.

To Samuel Pratt, of New Bond Street, in the Parish of St. George, Hanover Square, in the county of Middlesex, camp equipage maker, for his invention of certain improvements on elastic beds, cushions, seats, pads, and other articles of that kind—25th June—6 months.

Meteorological Journal kept at the London Institution.

DATE.	TIME.	BAROM.	Thermometer. IN.	Thermometer. OUT.	WIND.	REMARKS.
May 26	9	29·80	60	60·8	E.	Cloudy
	3	29·55	64	64·8	E.—N. E.	Ditto
27	9	29·55	60	60·6	E.—S. E.	Fine
	3	29·55	63	63·2	S. W.	Stormy
28	9	29·55	61	57·2	W.	Ditto
	3	29·55	63	63·4	S. W.	Ditto
29	9	29·55	59	60·8	S. W.	Fine
	3	29·55	62	64·2	S. W.	Ditto
30	9	30·00	60	60·6	S. W.	Rain
	3	30·00	63	64·8	W.—S. W.	Cloudy
31	9	29·85	61	57·6	S. W.	Ditto
	3	29·90	64	60·4	S. W.	Showers
June						
2	9	30·00	60	58·8	S. W.	Cloudy
	3	30·00	62	61·2	S. by W.	Ditto
3	9	30·05	61	59·4	S. W.	Heavy Rain
	3	30·00	63	63·2	S. W.	Fine
4	9	29·65	60	57·6	W.—S. W.	Stormy
	3	29·65	61	59·8	S. W.	Cloudy
5	9	29·55	58	55·6	W.	Fine
	3	29·60	61	59·8	W.	Rain, Hail
6	9	29·70	59	58·4	W.	Fine
	3	29·75	62	63·2	W.	Rain, Hail
7	9	30·05	69	53·8	N. W.	Cloudy
	3	30·05	61	57·4	W.	Ditto
9	9	30·40	60	57·8	S. W.	Fine
	3	30·40	62	64·4	S. W.	Ditto
10	9	30·30	60	59·8	W.	Cloudy
	3	30·30	63	64·2	S. W.	Ditto
11	9	30·30	62	62·2	N. W.	Cloudy
	3	30·30	64	67·2	N. W.	Fine
12	9	30·30	63	64·4	N. W.	Cloudy
	3	30·30	63	64·4	N. W.	Ditto
13	9	30·30	62	59·4	N. by W.	Fine
	3	30·30	64	61·4	E.	Ditto
14	9	30·30	63	60·4	E.	Ditto
	3	30·30	65	64·4	N. E.	Ditto
16	9	30·05	65	64·4	N. E.	Cloudy
	3	30·05	66	64·3	N. E.	Ditto
17	9	29·60	65	64·4	N. E.	Ditto
	3	29·60	66	66·4	S.	Ditto
18	9	29·50	60	60·4	S.	Ditto
	3	29·40	62	60·4	S. W.	Ditto
19	9	30.00	64	61·4	S. W.	Ditto
	3	30.05	67	66·5	S. W.	Fine
20	9	29·60	66	62·0	S.	Cloudy
	3	29·90	68	64·25	S. W.	Fine
21	9	29·80	64	63·0	S. W.	Rain
	3	30·00	66	62·0	S. W.	Cloudy
23	9	30·15	62	60·25	N.—W. N.	Fine
	3	30·15	64	63·0	N.—W. N.	Ditto
24	9	30·20	64	60·0	N.—W. N.	Ditto
	3	30·30	63	65·4	N.—W. N.	Ditto

CELESTIAL PHENOMENA FOR JULY, 1828.

D.	H.	M.	S.	
1	0	0	0	Clock before the ☉ 3' 25"
1	0	0	0	♃ Stationary near λ in Virgo.
3	18	1	0	☾ in □ last quarter.
3	23	0	0	☾ in conj. with ε in Pisces.
4	4	0	0	☾ in conj. with δ in Pisces.
5	0	0	0	Clock before the ☉ 4' 9"
6	0	0	0	♀ Stationary.
7	20	0	0	☾ in conj. with 1 θ in Taurus.
7	21	0	0	☾ in conj. with 2 θ in Taurus.
7	23	0	0	☾ in conj. with ε in Taurus.
10	0	0	0	Clock before the ☉ 4' 57"
11	0	0	0	☿ Stationary.
11	13	29	0	Ecliptic conj. or ● New Moon.
13	3	0	0	☽ in conj. with ☿. Long. 8° in Cancer. ☽ lat. 4° 46' S. ☿ lat 3° 31" S. diff. lat. 1° 15'.
13	8	0	0	☽ in conj. with 1 α in Cancer.
13	9	0	0	☽ in conj. with 2 α in Cancer.
13	12	0	0	☽ in conj. with ♀. long. 12¼° in Cancer, ☽ lat. 4° 39' S. ♀ lat. 3' 31" S. diff. lat. 1°.8'
14	7	0	0	☽ in conj. with σ in Leo.
14	17	0	0	☽ in conj. with π in Leo.
15	0	0	0	Clock before the ☉ 5' 34"
16	9	32	40	♃'s 1st Satt. will emerge.
16	18	0	0	♀ in conj. with 2 α in Cancer.
16	20	0	0	☽ in conj. with ν in Leo.
17	10	11	32	♃'s 3rd satt. will emerge.
18	4	0	0	in conj. with 1 α in Cancer.
19	16	3	0	☽ in □ first quarter.
20	5	0	0	☽ in conj. with λ in Virgo.
20	6	0	0	☽ in conj. with ♃. Long. 5° in Libra. ☽ lat. 1° 14' N. ♃ lat. 1° 6' N. diff. lat. 8'
20	0	0	0	Clock before the ☉ 5' 58"
21	14		0	☽ in conj. with 4 δ in Libra.
21	23	0	0	☽ in conj. with ϑ in Libra.
22	11	2	0	☉ enters Leo.
25	0	0	0	Clock before the ☉ 6' 8"
26	7	0	0	☾ in conj. with β in Capri.
26	10	19	0	Ecliptic Opposition, or ☉ Full Moon.
28	6	0	0	☽ in conj. with ϑ in Aquarius.
30	0	0	0	Clock before the ☉ 6' 3"
31	6	0	0	☾ in conj. with ε in Pisces.
31	11	0	0	☾ in conj. with δ in Pisces.

☽ The Waxing Moon.—☾ The Waning Moon.

Rotherhithe J. LEWTHWAITE.

METEOROLOGICAL JOURNAL, FOR MAY AND JUNE 1828.

1828.	Thermo.		Barometer.		Rain in inches.	1828.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low	High.	Low.			Hig.	Low.	High.	Low	
May						June					
26	68	45	29,74	29,62		11	72	55	30,20	30,16	
27	63	45	29,46	Stat.	,2	12	64	54	30,16	30,14	
28	62	45	29,57	29,46	,25	13	72	43	30,16	Stat.	,15
29	62	52	29,63	29,59		14	72	44	30,16	Stat.	
30	69	52	29,90	29,83	,625	15	73	49	30,16	Stat.	
31	59	50	29,86	29,80	,025	16	68	54	29,94	29,80	
June						17	73	55	29,58	29,53	,025
1	67	49	29,96	29,94	,075	18	68	50	29,50	29,43	,05
2	67	50	29,86	Stat.		19	70	55	29,90	29,86	,175
3	64	46	29,91	29,84		20	70	52	29,92	29,91	,1
4	59	52	29,61	29,46	,175	21	66	52	29,83	29,82	,35
5	62	46	29,50	29,29	,575	22	64	49	29,86	29,83	,125
6	65	48	29,74	29,56		23	68	54	30,06	29,96	,05
7	63	45	29,96	29,88		24	73	51	30,21	30,16	
8	64	46	30,11	Stat.		25	78	41	30,26	30,22	
9	70	45	30,15	Stat.							
10	66	44	30,20	Stat.							

LOWER EDMONTON CHARLES H. ADAMS

Lat. 51° 37' 32" N Long. 3' 51" W. of Greenwich.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. V,

[SECOND SERIES.]

Original Communications.

ART. XX.—ON WETTING PAPER FOR PRINTING BANK NOTES, AND A DESCRIPTION OF THE APPARATUS EMPLOYED FOR THAT PURPOSE AT THE BANK OF IRELAND, BY JOHN OLDHAM, ESQ.

To the Editors of the London Journal of Arts, &c.

GENTLEMEN—You will receive herewith the drawings and descriptions of my machine and contrivance for damping paper, to be printed upon, alluded to in my last, and which I have had in constant use in the bank note establishment since the year 1820. With so much experience, I am enabled strongly to recommend the adoption of it to plate printers in general. Before I proceed to particularise the several parts and operation of my apparatus, it may not be uninteresting to some of your readers to explain the reason that led me to inquire after

some method, whereby I could effect the process of wetting paper by means different from the old and injurious plan of dipping it by hand.

Having occasion at one time to print bank note paper of a remarkably thin and delicate texture, I found I could not damp it by any means known at that period, without sustaining a considerable loss of the material, of which little escaped unbroken, and still less when it came to be printed.

The difficulty of saturating it in the way required, I considered (for the first time) to be attributable to the quantity of air, contained in all porous substances, especially of an animal or vegetable production; and, consequently, the impossibility of its admitting the interfusion of any fluid while so occupied with air. It, therefore, naturally occurred to me, that to extricate the air from the pores of the paper, by means of an air pump, would enable me to effect the object I had in view.

I accordingly immersed a large book (in the first instance) in a glass jar of water, of corresponding dimensions, with a weight upon it, to keep it sunk therein. I then placed the jar upon the plate of an air pump, and covered all with a glass receiver; and when I proceeded to exhaust the latter of air, by means of the pump, that which was contained in the book bubbled forth to the top of the water, and, of course, was discharged. On opening the air valve, the water in the jar was forced by the pressure of the atmosphere between every leaf, and into every pore of which the book and its binding were composed. By this experiment the principle was fully established, and the apparatus about to be described was accordingly contrived and erected by me.

Plate IX, fig. 1, represents the external appearance of the apparatus; fig. 2, the same in section; *a*, an air tight

iron case of any given dimensions; *b*, a circular lid in front thereof, made to fit air tight; *c*, *c*, knobs or handles, by which the lid is to be lifted; *d*, a boss in the centre, for receiving the point of the screw *e*, belonging to the cross bar *f*, shewn apart at fig. 3, for keeping it in its place; *g*, an air pump on the top of the vessel *a*, and communicating therewith; *h*, *h*, pillars for the support of *i*, the principal beam of the air pump, and of *k*, *k*, the radius bars, and links of parallel motion, for keeping the piston rod of the pump in a vertical position while working; *l*, is a mercurial barometer, for denoting the degree of vacuum to be made; *m*, is a float gauge for shewing the water's height in the air tight vessel, its stem having a knob at top to prevent the gauge from falling below its assigned limits. The stem of the float passes through a guide tube, affixed to the top of the vessel *a*, in which it rises and falls. There is an air hole through the knob and stem of the float, which forms a communication between the vessel *a*, and the glass cover *n*, in order that the action of the air pump may draw the air from under the float also.

By these means the float is prevented from bursting by the expansion of the air within it, when the pressure of the air upon its external surface is removed. Hollow floats, to be used in fluids of different degrees of temperature, should be similarly made, for the purpose of permitting the egress of the rarified air, and the ingress of the cold air constantly taking place by the difference of their density, owing to the variations of heat and cold by which the float is occasionally surrounded. There is a small valve by the side of the glass cover for admitting the air after the degree of exhaustion has been effected.

The connecting rod *o*, is joined to the beam *i*, and the crank *p*; and *q*, is a tube proceeding from the vessel *a*, downwards, into a water cistern *v*, in which there is a

stop cock *r*; and at the lower extremity of the pipe or tube *q*, there is a strainer or filterer *s*, raised a convenient distance from the bottom of the cistern *v*. There is a cock, *t*, for admitting water from an elevated situation into the cistern *v*, and a cock *u*, for discharging it as may be required. There is also a cock *w*, for drawing off the water from the vessel *a*.

The paper to be wetted is placed in convenient piles, within open copper cases, made sufficiently heavy to keep all immersed in the water afterwards to be admitted. The cases and paper contained therein, marked 1, 2, 3, 4, 5, 6, are shewn in their places within the vessel *a*. There are vacant spaces shewn in the upper parts of the cases, which are for the purpose of allowing the paper to expand as the water finds access to it. The cistern *v*, being allowed to fill with water by opening the cock *t*. The cock *r*, is also to be left open when the pump is set to work. As the vessel *a*, becomes exhausted of air, the pressure of the atmosphere upon the water in the cistern *v*, forces it through the strainer or filterer *s*, up into the vessel *a*, until it arrives at the bottom of the float *m*, which is signified on the outside, by the rising of the knob under the glass cover *n*.

At this period the cases of paper are wholly covered with water, the cock *r*, must now be shut, and the action of the pump continued until the mercury in the barometer, by the weight of the atmosphere, be forced to the top of the scale. On opening the vent cock, the air rushes into the vacuous space above the water in the vessel *a*, and forces it into the pores of the paper. This space requires to be exhausted three times at least, before the water be let off, it being very difficult to withdraw the air at once from the interior of the paper.

The vent cock at the top of the vessel *a*, and the cock

r, in the pipe *g*, are now to remain open, until the water which has not been taken up by the paper runs back again into the cistern *v*. The paper of 3,000 bank notes, takes up 9lbs. of water as nearly as possible, which is the compliment I usually put in each copper case.

The paper on being taken out must have the water partially expressed from it, by a common screw press; and before it can be completely finished, it must be passed between squeezing rollers, pressed together by given weights, acting upon a double set of compound levers, for the purpose of increasing the power so obtained to a considerable extent. The weight for each denomination of paper to be printed, ought never to vary beyond what is found most suited to the different description of texture it possesses.

The applicability of this principle to several of the arts and manufactures is manifest, namely:—The dyeing and sizeing of various materials, the pickling of all kinds of animal and vegetable substances, the steeping of flax and corn, &c. (all of which I have experimented upon, with the most satisfactory success) also the tanning of leather. In short, every thing connected with chemical science; wherein, certain bodies require to be saturated by the several denominations of fluids, singly or combined, can always be more speedily and effectually performed by this means, than by the ordinary methods commonly practised. Those suggestions I published in the newspapers of the day, 1820.

I am, Gentlemen,

Your obedient Servant,

JOHN OLDHAM.

Bank of Ireland,
14th July, 1828.

ERRATA.——In page 201, line 18, for "*clipping* by hand," read "*dipping* by hand."

Art. XXI.—On the Invention of Money, and by whom, in the earliest ages of the world; by B. Cook, Esq.

To the Editors of the London Journal of Arts, &c.

Gentlemen—I intended my former letter on the invention of money, as introductory to the origin and use of it; and in this I shall endeavour to point out those ingenious men who invented it, and gave it for the use of man, in its first rude and natural state, that it might be employed in exchange for those articles he needed to supply his wants. I shall then descend to the time when coins and medals were brought to more maturity, and rendered capable of assisting the historian in his endeavours to ascertain the period of many great events that have happened on the earth; and which the pride of man, and his thirst after immortality, had induced him to create, to hand down his name and actions to future ages, by giving existence to coins and medals, as lasting memorials of his fame. These few and mutilated remains are like faint rays of light, which feebly illuminating those dark periods of time, serve in some degree to enable the historian and antiquarian to read the mutilated records of ages long passed away.

I will, therefore, in this letter, endeavour to show who were the first inventors of money, and what were the first forms given to it,—and why the same form should have been adopted almost all over the habitable world; nor can we any way account for money having the same shape among all nations, than by giving the merit of the invention to the most ancient nation of the world whose history has reached us,—a nation that early rising into power, sent forth armies and colonies into other regions,

who had kings that governed it, and laws to regulate its government—*I mean the Scythian nation;* and I think I shall be able to prove that the Scythians were the first inventors, and that it was from them the surrounding nations learned their art, and adopted the form they gave to their money, namely the *oboliscal.*

It is natural to suppose that the first movement of the human mind, in a state of nature, was some contrivance to protect itself. Man, surrounded with enemies of every sort, found it necessary to invent some method, some weapon, to defend himself, not only against his brother man, but also against the beasts of the desert that sought to destroy him for food. Besides, he had another and more imperious call, that must be obeyed, the call of hunger, that forced him to contrive some weapon with which he could kill the inhabitants of the forest for food. He therefore fixed upon his spear and arrow, a pointed stone, the Belemnite,—and as these stones became things of use, a value was attached to them,—and those that gathered them bartered them away, for the supply of their wants, to others who needed them. This no doubt was the first of all monies that circulated among men, and the same form was continued in after ages, until those stone monies were displaced by metals, as I shall hereafter show.

The earliest of all money in existence is of an oboliscal form; and this primitive shape proves that it had its form from the Belemnite, as being the material his wants first called into use and value, to protect himself, or purchase from others what they could spare from their own wants. Besides, the extreme simplicity of the oboliscal form of money proves its great antiquity, and which form still exists among the Arabs, with engraved characters upon it; and although this people have money of the same form as ours, yet they still, in some instances, preserve

the ancient form. This money, which is called *Larins*, have pretty nearly the same figure as the *Diobolus* of Catania, except that the oboliscal form is rather longer. All the earliest monies of Greece were oboliscal, which I shall more particularly notice hereafter. It is not only at the extreme parts of Asia, but also in the north and east of the continents of Europe, that we find money of the same form as that anciently employed in Greece;—Japan, which was peopled by the ancient Scythians, furnishes us many examples—the figures, the characters, incribed upon their money, and the pieces of metal that serve them for money, evidently resemble the *obolus* of the Greeks.

The small oval money of Persia is but a section of the obolus. The Chinese, which Buffon considers as of the same origin as the Tartars, and, consequently, descendants from the Scythians, have money of an oboliscal form. But it will take up too much space to enumerate all the different countries whose first monies were of this shape. I, therefore, only mention these nations as being the most ancient, to prove that the first forms given to money were oboliscal, from the stones first used in pointing their arrows,—the Belemnites; and which form seems to have been generally adopted almost throughout the world, thus acknowledging one common origin, and belonging to one family, and that although scattered abroad upon the face of the earth, carried with them, and continued, the earliest customs of the people from which they sprung; and though separated, and sent forth to colonize, other parts of the world, still continued to use in their transactions one with another the form of the money invented and used by their ancestors.

According to *Hygin*, a king of Scythia named *Indus*, invented and coined money first in Scythia, and this

author adds, that *Erichthonius* borrowed the invention from the Scythians, and introduced the use of it at Athens. Pliny also attributes to him the invention of money, see Plin. Hist. Nat. lib. 7, cap. 46.—" *Argentum invenit Erichthonius Atheniensis,*" *&c.* He described him, not as the first inventor, but as the man who made its use known, and struck upon it characters that marked its value; and this is confirmed by a passage in *Julius Pollux*, who says, " *Primus nummum Atheniensibus, inscripsit Erichthonius.*" An artist, named *Lycus*, was employed by Erichthonius to make the first monies of Athens.

But there is no doubt but money was in circulation in Scythia before the reign of Indus, which invention was carried by Erichthonius to Athens; for it appears that this prince passed into Scythia during the ten years of the reign of usurpation by *Amphictyon* on the throne of Athens. Amphictyon was the father of *Ithonius*, and from an ancient tradition, preserved in Lucain, the honour is given to this prince of being the first to introduce the use of money into Greece. Now this prince was contemporary with Erichthonius, and it is certain did bring the invention and use of money into Thessaly, where he reigned. But as he was the grandson of *Deucalion*, who was born in Scythia, it was from thence, following the example of Erichthonius, that he introduced into his kingdom an useful institution, long known in the country of his ancestors the Scythians.

The use of money was known in Arabia at the time the Book of Job was written, and which has been supposed by some authors to be translated by Moses; for a money is there spoken of, called *Kesitah;* which word, according to Bochart, expresses a female lamb. But he does not suppose that the payments thus made were really

in living animals, but in a current money that was thus named. In the time of *Akiba* the money of Africa was of the oboliscal form, and which was still called *Kesitah*, its name indentifying it with the Kesitah of the ancients, and its form corresponding with the money, called Larin, of the Arabs, shews that this money existed at the time of Job, and even to the time of Jacob, more than three centuries before Erichthonius gave money to the Greeks of the same form; therefore money was known, and in use, before the time it has been supposed to have been introduced into Greece by him. In the time of *Cadmus*, who, according to the Arundelian Marbles, arrived in Greece accompanied by the Arabs, and fixed themselves in the island of Eubea 1519 years before Christ, while Amphictyon reigned in Athens; but Sir Isaac Newton, in his Chronology, states that Cadmus flourished only 1045 years before Christ, and imagines that the emigration of the Phœnecians and Syrians was occasioned by the conquests of David. "These people," he says, "fleeing from David, came, under the conduct of Cadmus and other captains, into Asia Minor, Crete, Greece, and Lybia, and introduced letters, music, poetry, metals, their fabrications, and other arts, sciences, and customs of the Phœnecians. This happened one hundred and forty years before the Trojan war, and about the sixteenth year of David's reign." If Sir Isaac Newton is correct, there must be an error in the Arundelian Marbles, and Cadmus could not have been the inventor of those things attributed to him. Other chronologers, as Dr. Blair, &c., agree in their accounts with the chronology of the Marbles, that Cadmus founded the city of Thebes in the sixty-fourth year of the Attic æra, 1519 before Christ.

Bochart also supposes that Cadmus was a fugitive Canaanite, who fled, with others, from the face of Joshua

into Greece. Other writers state, that Cadmus, with the Arabs that accompanied him, established themselves in the island of Eubea, and that they introduced with them money into Greece; but no author attributes to Cadmus, or the Arabs, the honour of being the first inventors, or the first introductors of it. These people, not having any intercourse with Japan, could not borrow the form of their money from thence; nor is it likely that the Greeks, the Arabs, or the inhabitants of Japan could have received from each other the form of their money. The probable conclusion is, that, Scythia being placed between Greece and China, as well as between Arabia and Japan, all these nations obtained from the Scythians the first invention of money. Ancient writers pretty nearly agree as to the time that silver was introduced into Greece, and *Lucain* states that *Ithonius* used gold as money, which has caused some to regard this prince as the inventor of gold money.

It was during the reign of Cadmus that money was multiplied in abundance, by being made of copper, for he discovered the method of manipulation, and casting of metals, by the use of *Lapis Caliminaris;* and by this discovery he was enabled, not only to increase the quantity of money, but also improved their weapons of war; for it is certain that before this prince the people could not have had any weapons of brass or iron. The arrival of Cadmus preceded the reign of Erichthonius only by six years, so that when he brought into Greece the use of money, made of metals, their spears and arrows must have been pointed only with the stones Belemnites, whose figure was continued, in the shape of their money the obolus.

The Arundelian marbles, Epoque 11, fix the introduction and use of iron into Greece during the reign of Pan-

dion 1st, the successor of Erichthonius. The obolus, in the time of Plutarch and Lucien, was a money of the smallest value, and made of the cheapest metals, chiefly of lead, as being a metal easy of fusion and soon made. The double obolus with the Romans was the salary of a courtezan of the lowest degree, an old female slave was valued at the same rate, and to indicate a man not worth notice, he was called a man of three obolii. The obolus, in the time of Terence, was the least price for a meal; and, in the time of Augustus, the same price was paid for the use of a public bath. Martial estimates the obolus as equal to the fourth part of the *As*. Nevertheless, this money had a different value under different reigns.

Janus came from Greece with a colony, and established himself in Italy, he is called the inventor of crowns—ships—and navies, and was the first that struck engraved impressions upon copper money; for this invention many cities of Greece, Italy, and Sicily, have represented him upon their coins with a double face, and on the reverse a crown, or a ship—the first fixed his colony in that part of Rome, which is still called *Janiculus*, after the name of this prince. The Greeks having adopted the invention of Janus, struck the double head on many of their coins in honour of him, which was also introduced into the colonies which were afterwards established in Sicily. This new invention of striking figures upon money made of copper gave some sort of perfection to it, in raising it up from the simplicity of its ancient form, which until this time it had been subject to.

Eusebus fixes the commencement of the reign of Janus in Latium, 150 years before the arrival of Eneas in Italy, which, according to Denis of Harlicanassus, was two years after the taking of Troy, when he cast anchor in the

mouth of the Tiber. Thus the coming of Janus into Italy preceded this celebrated epoch 148 years, who must then have left Greece 106 years after the death of Erichthonius, the time when the oboliscal money was in circulation in Attica and Thessaly, and therefore brought by him into Italy.

I find great difficulty in endeavouring to ascertain to whom the invention of money really belongs, by striving to draw aside the dark clouds that cover this early period of time, which is so little known in these days; for we find that Erichthonius, whose reign of fifty years was finished about 1463 years before the Christian era, and that he first received from the Scythians the form of the oboliscal monies, which he carried with him into Attica, and upon which he engraved letters. About the same time Ithonius introduced the use of money into Thessaly, which he made of gold and silver, and on which he engraved letters; but it was Janus that carried this invention further, about 1363 before Christ, for he struck upon, or cast upon, money figures, and other emblematical designs. This made it necessary to change the form of the oboliscal money, in order it should be proper to receive figures and inscriptions. But I shall endeavour to describe in a future paper what were the new forms introduced by Janus; nevertheless I would observe here, that when these new monies were introduced, the primitive forms were not entirely abandoned and destroyed, although they appear to have only served for money of the lowest value; and although in many of the cities these oboliscal monies were in a great degree abandoned, for which they substituted in their place the round money, yet upon some of it they still struck the form of the ancient money with inscriptions and emblems, which pointed out to which city such money belonged, or rather in which city the money

was coined; but on this head I shall speak more in my future communications.

I am, Sir,

Yours, &c.

Birmingham, July 17, 1827. BEN. COOK.

ART. XXII.—ON THE IMPROVED STREET LAMPS OF EDINBURGH. BY JOHN ROBISON, ESQ.

To the Editors of the London Journal of Arts, &c.

GENTLEMEN—I beg leave to send you a sketch of my improved street lamp and lamp pillar, which has been recently adopted by the board of Commissioners of Police in this city, and gives very general satisfaction to the public as an article both of utility and elegance.

Plate XI, shews the construction of the new street lamp and pillar, both as to its external appearance and internal arrangement.

The lamp pillar consists of two pieces of cast iron, and a frame of wrought iron for the support of the glass; fig. 4, is a view of the lamp pillar with all its parts complete as when erected; fig. 5, is a section of the same, shewing the construction of the parts within.

In erecting the pillar the base *a*, is set on the stone by the assistance of a spirit level, and the butts *b*, *b*, are bedded into the stone level with the pavement, and secured by lead. The shaft *c*, *c*, (previously adjusted to its base at the foundry,) is then slipped on it, and the key driven through as at *d*, which confines the shaft and the base firmly together.

The lamp iron or frame *e*, is attached to the head of the pillar, and is secured on the same principle by two screwed pins at *f*. The cross bar *g*, for the lamp-lighter's

ladder to be placed against, is made flat on the face, and a little thicker below than above, to allow of the light striking on its surface, on which the names of the streets, &c. in which the lamps are to be placed is to be cast in relief on both sides. The pillars are to be painted of a dark colour, and the letters made white.

The glasses are open at bottom, with an inch and half aperture as a vent hole; but in order to prevent the wind from disturbing the flame, a disc of tinned iron slides on the gas pipes to a regulated distance from the opening.

The covers are constructed as shewn in the figures, having a chimney in the centre for the purpose of maintaining a current of air through the interior of the glass, and to carry off the watery vapour generated by the combustion of the gas, which would otherwise condense on the surface of the glass, and by rendering it partially opaque, obscure the light.

The experience of last winter has shewn that this construction of lamp post possesses an important advantage over those previously used here. There is very little shadow beyond its own base, the lights burn steadily in the most stormy weather, the casualties to the glass have been much diminished, and the difficulty of climbing the pillar, (from the absence of projecting ornaments) has put a stop to the stealing of the brass work in the burners. The dust likewise, from finding no lodgement, is immediately washed away by every shower of rain.

I accompany this with a certificate from the board of Commissioners of Police in this city, stating to what extent the lamp and pillar has been employed and generally approved.

I am, Gentlemen,

Yours, &c.

Edinburgh, June 18, 1828. JOHN ROBISON.

(COPY.)

Police Office, Edinburgh, 16th June, 1828.

This is to certify that 450 lamp pillars of the pattern furnished by J. Robison, Esq. of this city, have been put up within the last eight months, and that about 200 more are in progress. That these pillars have on trial been found completely to answer, being very cheap in the first cost, affording complete protection to the gas fittings, and great security to the globes; that the mode of fixing the shaft and the globe iron has been found of great advantage when repairs have been wanted on the gas pipes; that these pillars have been adopted in Leith, and also in Greenock; that the inhabitants of some of the principal streets have requested leave to remove the pillars of the old pattern, and at their own expense to substitute the new; and that the mode adopted by Mr. Robison of having the names of the streets cast in relief on the cross bars of the pillars, has been found to be a material improvement on all the methods hitherto tried here.

(Signed) ALEXANDER RAMSAY,
Inspector of Police.

Recent Patents.

To HENRY PINKUS, *of Philadelphia, in the State of Pensylvania, in the United States of North America, but now residing at the Quadrant Hotel, Regent Street, in the County of Middlesex, Gentleman, for his having Invented or found out an Improved Method or Apparatus for Generating Gas, to be applied to Lights and other purposes.*—[Sealed 15th August, 1827.]

THE leading feature of this invention is an apparatus to

be adapted to a kitchen range, or to any other grate, for the purpose of generating gas for the use of the house and premises adjoining, by means of the ordinary fire used in the kitchen or other room. Plate XII, exhibits the apparatus and also the mode of purifying the gas, which forms the subject of another patent, of subsequent date to the above, the specification of which will follow this.

We understand that the plan of this improved apparatus succeeds to the perfect satisfaction of the patentee, who has favoured us with some practical remarks as to cost of materials, and quantity of gas produced, which we will insert at the close of the specification: and as the invention has been described with considerable minuteness by the patentee, we shall give his own words.

"My invention of 'An improved method or apparatus for generating gas, to be applied for lights and other purposes,' consists in the application to a common fire-grate, kitchen range, or other ordinary fire-place used for domestic or other purposes, a cylindrical retort, as shewn in figs. 1, 2, and 3, or a retort in the form of an oblong, as in figs. 4, and 5, made of iron or other metal or material not too readily fusible. And in all of which figures, the retort is marked *a, a, a.*

"The cylindrical retort is divided into two or more compartments, *b, b, b,* terminating in a hollow axis *c,* of a conical shape, the smaller end of which is placed toward the front. The back part of this circular retort is conical, ending in a small circular projection *d,* as seen in section in fig. 2.

"The compartments of the retort, with the partitions and hollow axis, all terminate upon an inverted cup-shaped vessel, which is perforated with holes leading into the cup, as shown in fig. 3, forming a free communication between

the compartments and the hollow axis through the whole interior of the retort.

"A front view of the retort is shewn at fig. 1, as applied to an ordinary kitchen range, which is equally applicable to any other ordinary fire-place. The same is also exhibited in section in fig. 2, and endwise in section in fig. 3. The front edge of the retort is turned smooth with a shoulder, and fitted into a cast iron rim *g*, *g*, in which it revolves by the assistance of a common winch. This plate is the support of the retort in front, and together with the projection *d*, behind, holds the retort in a horizontal position.

"The front of the retort is provided with a circular aperture for each of its compartments, having conical doors *h*, *h*, *h*, close fitted and ground gas tight, and secured by means of cross bars and screws, or in any other convenient manner, and luted in the usual way.

"The hollow axis of the retort is terminated at the lesser end in a small projection by means of a short pipe *k*, screwed in the front. To this projection a pipe *l*, is attached by a gas tight conical joint, through which the gas passes off as it is evolved.

"The hollow axis may be perforated with holes at the lesser end, communicating with the divisions of the retort, so as to allow the tar as it becomes condensed, to fall into the lower compartment without first entering the cup at the end.

"In order to prevent the small coals or other material in the retort from falling into the hollow axis, a thin semicylindrical plate is attached to the conical joint, always covering the upper holes in the hollow axis.

"At the lower side of the rim *g*, in front of the retort, there is a ledge, and on each of the perpendicular sides

are projections, having rabits or grooves in their edges to admit of a sliding pannel *n*, which is allowed to slide down occasionally, in order to conceal the whole front of the retort from view, and protect it from the immediate action of the fire.

"In the back part of the fire-place, and behind the ordinary grate or kitchen range, is formed a circular recess, which I call a furnace, lined with fire bricks, or other fire proof material, and of sufficient capacity to receive into it the retort, and leave a small clear space all round between the retort and furnace, except at the lower side, where it may be several inches wide, into which recess the retort is placed supported behind and before, as described.

"The retort being mounted in its proper position in the furnace, as described, it is now charged with coals or any other material from which gas is to be generated through the apertures communicating with the compartments, or through the doors in figs. 4, and 5, which are then to be closed gas tight.

"The retort being thus charged, one of the compartments is placed at the lower side of the furnace nearest to the fire, when a part of the flame and heat will pass through the aperture *a*, into the furnace, and act on the lower side of the retort, producing a red heat on the lower division, and proceeding round the retort, will escape through a small aperture at the top of the furnace into the chimney.

"When the compartment, or part of the retort nearest the fire attains a red heat, gas will be evolved from the material within it, and pass through the perforations in the cup-shaped partition to the cavity at the back, and thence proceeding through the hollow axis to the pipe 6, will ultimately reach the refrigerator, which should be situated higher than the retort, so that the grosser parts evolved, when condensed, will be precipitated into the pipe *l*, and

descend again through the hollow axis and reservoir, into the lower compartment, and there coming in contact with the ignited material, or with the red-hot sides of the retort will again pass off in the form of gas as before.

"When any of the divisions of the retort in fig. 3, has remained a sufficient time against the direct action of the fire to decompose its contents, the retort is to be turned round on its supports *d*, and rim *g*, and one of the other compartments brought to the position previously occupied by that division, the contents of which has been so decomposed. The same process is to be observed with all the divisions, until the whole of the material in the retort has been sufficiently decomposed.

"The object I have in view by this form of the retort, is a separation of the coals or other material to be decomposed into smaller quantities, thereby presenting successively thiner layers to the action of heat, which will more readily penetrate and effect decomposition.

"The other form of retort adapted to my improved method of generating gas is shewn in fig. 4 and 5. The former of these figures represents a front view of the retort, with the inclosing plate removed; *a*, *a*, is the oblong retort, rounded at its ends; it is placed horizontally in an oblong furnace, situated similarly to that before described, and made in the same manner. Between the back of the retort and furnace, as seen at *g*, in the section, fig. 5, is a space one inch wide, extending the whole length and half the height of the retort, which may be supported by two bars of iron, *r*, *r*, placed under it, at the back and front of the furnace.

"At the bottom of the retort, and in contact with it, nearest the fire, there are cross bars of iron *s*, their ends resting on the bars *r*, *r*, which are bent to receive them. These cross bars are intended to protect the bottom of

the retort from the intense action of the fire on the under part of it, and when much burnt may be withdrawn, and fresh bars substituted.

"On the upper side of the retort there are dampers *t*, *t*, for regulating the draught, and *l* is the pipe for carrying off the gas.

"In figures 1, 3, 4, and 5, there is a pipe *u*, which brings into the retort the condensed matter from the refrigerator.

"Fig. 6, represents a longitudinal section of the refrigerator *v*, *v*, which consists of a contorted pipe, immersed in a vessel of water *w*, *w*, for cooling and condensing the gas. This refrigerator is connected with a tar vessel *x*, *x*, below, by the branch pipes *y*, *y*, which dip into the tar, and deposit the condensed matter. Fig. 7, is a cross section of the refrigerator and tar vessel, and *z* is an additional tar vessel or feeder communicating with the other tar vessel by a bent tube. Into this feeder any of the animal or vegetable oils, or other fluids, may be put, which may be made to flow through the pipe *u*, *u*, into the retort in a thin stream, where it will mix with the ignited material, and gas will be evolved.

The operation of the retort, shewn in fig. 4 and 5, is as follows. This vessel *a*, being charged with coals or other material to be subjected to distillation, the cover is then placed on, and fastened, as before described, by a cross bar. The fire in the range or grate is then raised in the usual way, when a part of the heat will pass through the aperture *o*, and around the retort; gas will by that means be produced from the material, which will rise through the conducting pipe *l*, which dips into the tar vessel *x*, *x*, whence, rising through the tar, it enters the refrigerator *v*. The gas then passes through the pipes, allowing the tar to fall into the vessel below through the pipes *y*, whilst the

gas passes off by the exit pipe to the gasometer, situate at any convenient distance.

"As the tar rises in the vessel x, by deposits from the condenser, or by the supply from the feeder z, to the top of the pipe u, u, it will descend by this pipe into the retort, where gas will be evolved and pass off as before. The pipe u, is bent, as shewn in fig. 6, so as to contain a column of fluid greater than the dip pipe l, in the tar vessel; this will prevent the gas rising in the tar pipe during the action of the retort.

"I do not confine myself to the use of any particular material from which to generate gas, but avail myself of any of the animal or vegetable oils or fluids, or any other material from which carbonated hydrogen gas may be obtained. I claim to be the original inventor of the combinations herein described, which are made up by combining retorts for generating gas placed in furnaces with the common fire-place fire-grate or kitchen range, and with refrigerators. However the retorts, grates, ranges, furnaces, or refrigerators, may be varied in their forms or construction. And I claim to be the original inventor of the combination making up the retort specified and shewn in figs. 1, 2, and 3; but I disclaim being the discoverer or inventor of the separate parts thereof. And I further disclaim being the inventor of any of the particular things which it has been necessary for me to mention, not included in the above claim made by me."—[*Inrolled February*, 1828.]

So far is the *Domestic Apparatus for Generating Gas*, with which the purifying apparatus, forming the subject of the following patent, is to be associated.

To HENRY PINKUS, *of the City of Philadelphia, in the United States of North America, but now residing at the Quadrant Hotel, St. James's Street, in the County of Middlesex, Gentleman, for his having invented or found out an improved method of purifying Carburetted Hydrogen Gas, for the purposes of Illumination.*—[Sealed 17th November, 1827.]

THIS invention is to be used in conjunction with the foregoing apparatus or not, as may be required; it is a mode of purifying gas, and divesting it of its unpleasant odour, by mixing with the gas, in different ways, a chemical preparation. The particulars of which are set forth as follows.

"My invention consists in the use of chloruret of oxide of sodium, and the chloruret of lime, (the latter of which is well known in England by the names of the chloride of lime, or bleaching powder, or oxymuriate of lime,) combined with an apparatus applying the same to practice in private houses and in other places for giving a more perfect purification to gas, and destroying the bad smell of gas supplied from the public mains.

"My method is as follows, (reference being had to the figures exhibited in Plate XII). After refrigeration and condensation has taken place in the gas, I cause it to pass through a solution of the chloruret of oxide of sodium, or of lime, or chloride of lime; which solutions may be contained in one or more vessels, having shelves in the usual way, or as shewn in section in fig. 7, through which the gas may be made to pass, acting under a pressure equal to a column of water of from ten to twenty inches, by which means the gas will be purified, and its obnoxious odour or bad smell removed.

"When gas is to be purified in the large way, as at the large gas works, it may be judiciously effected by first passing the gas through a solution of common lime and water, as is now usually practised, or it may be first partly purified by any of the other well known methods, after which a more perfect purification may be given, and its obnoxious odour removed by passing it through a solution of the chloride of lime as above directed. I sometimes pour into the feeder *z*, fig. 6, the said solution, whence it passes into the tar vessel, through the bent tube.

"In this vessel, which communicates with the retort by the pipe *u*, the solution will mix with the condensed matter that falls into it through the branch pipes connected to the refrigerator, which is immersed in a vessel of water. The compound thus formed and kept agitated by the gas issuing from the dip pipe, is made to flow in a small stream through the pipe *u*, into the retort while in action, where, coming in contact with the ignited material within the retort, other vapours or gases will be generated, which combining or mixing with the carburetted hydrogen gas, a chymical action will take place, whereby the gas while in the retort, and during its passage through the refrigerator, will become partly purified, or will be so rendered as to be more easily acted upon in its passage through the solution of chloride of lime, when its purification will be finished; or the aforesaid compound from the tar vessel may be made to flow in a small stream into a separate retort while in action, and the vapours made to mix with the carburetted hydrogen gas, in its passage through the refrigerator.

"The solution of the chloride of lime to be poured into the feeder *z*, may be taken from the purifying vessel, fig. 7, after the gas has passed through and it has become

saturated with the ammoniacal liquor, and the chloride of lime may be applied in a dry or simi-fluid state, in the manner in which common lime has been used in a dry or semi-fluid state.

"In preparing the solution there should be one part of the chloruret or chloride, to about thirty-five parts of water. When the chloruret or chloride is prepared in its most concentrated state, a diluted acid, sulphuric or muriatic, may be added to the solution, to assist the liberation of the chlorine gas from the lime, and the quantity of water may then be increased from forty to fifty parts, with one part of the chloride of lime.

"Fig. 8, represents a section of the other form of purifying apparatus, designed for private houses, to render a more perfect purification of the gas supplied from the public mains, and to destroy its obnoxious odour before it is admitted to the burners; *i*, is a recipient, intended to contain and supply the purifying liquid; this vessel is connected with another vessel *k*, by a cyphon, or by a bent tube *e*, inserted through the centre and top of the lower vessel *k*, and having a stop-cock *m*.

"The lower vessel *k*, is made gas tight, and formed of tin, copper, or sheet-iron, and is a receptacle for gas, which flows through it, and for the purifying liquid that falls from the upper vessel *i*. There is a common spunge *n*, placed on a shelf of coarse wire gauze; *p*, is a man-hole, made in the side of the vessel *k*, sufficiently large to admit the hand and spunge; *g*, is a pipe leading the gas from the main; and *r*, is another pipe to supply the gas in a purified state to the burners; *s*, is a waste pipe to let off the liquid when it has become too much impregnated with the impurities of the gas; and *t*, is a washing-pipe leading from a cistern, with stop cocks for admitting and drawing off the liquid.

"The operation of the apparatus represented at fig. 8, is as follows:—Into the recipient I pour a mixture of one measure of the concentrated liquor of the chloride of lime, diluted with twenty-five or thirty measures of water, or pour in the clear liquor from the solution of the chloride of lime. When gas is required to supply the burners, turn on at the same time the stop cocks in the bent tube *l*, and the leading pipe *g*; the purifying liquid will then flow through the bent tube *l*, on to the spunge, which will absorb a portion sufficient to keep it always wet, and will permit the liquid to filter through and fall to the bottom of the vessel *k*, at the same time the gas will continue rising through the moistened spunge *n*, where it will be acted upon by the purifying liquid, and its obnoxious odour will be removed before it arrives at the burners through the supply pipe *r*.

"The object I have in view in causing the gas to rise through a spunge or other porous substances, is in order to supply the gas to the burners without too much agitation, this being indispensible, in order to afford steady lights, and prevent their dancing or moving up and down, a circumstance consequent on passing the gas through the body of a solution which would agitate the gas so much as to either wholly extinguish the lights, or to render them too unsteady for use.

"The tube *l*, should be bent, as shewn, so as always to contain a column of liquid sufficient to prevent the gas from rising into the recipient *i*.

"When the purifying liquid has filtered through the spung, it may be drawn off from the vessel *k*, and poured into the recipient *i*, to be used over again, until it becomes too much impregnated with the impurities of the gas, when the liquor should be allowed to run off at the waste pipe *s*, and fresh liquor substituted.

"The proper size of a purifying apparatus for a private house will necessarily depend upon the number of lights used. For eight or ten burners the capacity of the recipient *i*, should be about three gallons, the lower vessel *k*, three feet in length and six inches in diameter. The size of the bent tube *l*, or its lower aperture, should be so regulated as to cause the necessary supply of the liquid to filter through the sponge during the whole time the lights are burning, and should be shut off when they are extinguished.

"I claim to be the original inventor of the combination above described, for purifying carbonetted hydrogen gas for illumination, with acid in conjunction with the chloruret of oxide of sodium, or the chloride of lime, by means whereof the gas becomes purified in a greater degree than heretofore. And I claim to be the inventor of the apparatus shewn and described in the figures; but I disclaim being the inventor of operating on gas by ammoniacal liquor, except when in combination with the solution of the chloride of lime; and the manner of using it when so combined.

"And I further disclaim being the inventor of any of the things which it has been necessary for me to mention and describe, which are not included in the above claim made by me."—[*Inrolled May*, 1828.]

To the Editors of the London Journal of Arts, &c.

Gentlemen—In compliance with your request to have an outline of the economy of my improved method of generating gas for domestic use, I have pleasure in submitting the following statement, verified by many experiments during the successful and continued operation of the process for several months. An apparatus of a capa-

city to receive for distillation one bushel of coals of the first class, (such as cannel or Scotch splint), combined with a common kitchen range or fire-grate, in which is consumed daily, for ordinary purposes, from half a bushel to three pecks of coal, will generate by the superfluous heat, (usually in about five hours,) 240 cubic feet of gas of the specific gravity of .660. Of this gas, 2¼ cubic feet will supply an argand burner having 15 holes 1-40th of an inch diameter with a flame 2½ inches high one hour,—or 24 such burners for *four hours* every day, each burner giving light equal in intensity to six mould candles six to the pound:—Estimating these as only £4 burners, (the £4 burners average three hours per day during the four quarters of the year, Sundays not included), the value of the gas generated will be for one year £96.

The quantity of coals used in the apparatus to produce the above supply, is eight and two-thirds chaldrons nearly, the cost of which at

40s. per chaldron, is - - - -	£17	6	8
Deduct the quantity and value of coke left in the apparatus after the gas is evolved, (one-third increase in measure,) 10 ch. 32 b. at 25s. per chaldron - -	13	12	2¾
And the cost of gas to supply 24 argand burners for one year will be - - -	£3	14	5¼
Leaving a clear gain of - - -	92	5	4¾

I have made my estimate from coals of the first class, because they are better suited to this domestic purpose, owing to their affording a larger quantity of gas, of a quality superior to that of other coals, and, as is well known, nearly equal in illuminating power to oil gas, added to the advantage of requiring only 2¼ cubic feet per hour for each burner, whilst *five* cubic feet are necessary when obtained from coals of the second class, or such as supply the

public mains, consequent on the less specific gravity of the latter.

It will be seen that I obtain only about half the quantity of gas that these coals are capable of yielding, because of the moderate heat with which the distillatory process is carried on. When carbonized in the large way, their average produce is about 16,000 cubic feet per chaldron; but, by the former process the coke is more solid, and consequently more valuable.

The above is an estimate of the capable production of only a medium size apparatus. To such places as hotels, coffee-houses, warehouses, &c. where large fires are used, it may be adapted of more than double the capacity to each separate fire-place: the apparatus is charged only once a day.

By the present mode of using fuel in common ranges and grates, a large portion of its component and most valuable part is lost in the form of smoke, through the chimney; but if a part of it be submitted to the action of the apparatus, with the attention of twenty minutes each day, that which would have been lost in the form of smoke may be preserved, and will give light equal in value to four times the original cost of the fuel, which is improved, since coke is better suited for culinary purposes, and gives a more intense heat than coal in common grates.

I have only to add, that the improvement is in successful operation in different places in London, and from its pleasing reception, and the numerous applications which have been made to the "Domestic Gas Company," I have reason to anticipate its adoption very generally.

I am, respectfully,

Your obedient Servant,

HENRY PINKUS.

London, 24th July, 1828.
Office of the Domestic Gas Comp. 178, *Strand.*

To George Burges, *of Bagnigge Wells, in the County of Middlesex, gentleman, for his invention of certain Improvements in the Construction of Wheeled Carriages, and Wheels to be attached to the said Carriages, or for other purposes.*—[Sealed 26th May, 1827.]

This invention is a peculiar mode of constructing carriages and carriage wheels, upon which subject the patentee appears to entertain some very singular notions, and the opening of his specification is so extraordinary, that we cannot desist from placing it literally before our readers. His words are these:—

"Of all the plans hitherto adopted for the non-attainment of the very object which the planner vainly endeavoured to accomplish, the usual method of building four wheeled carriages may be fairly quoted for its pre-eminence in absurdity; where, through the most unaccountable disregard of the first principles of the laws of matter at rest and in motion, the problem has been solved the very reverse of the one whose solution was required; viz. how to produce the minimum of effect with the maximum of power.

"But as the defects of a stupid system cease to excite even momentary attention, as soon as the perfections of a sensible one are brought to light, it is needless to dwell upon the painful detail of the why and wherefore horses are knocked up, carriages overturned, and limb and life endangered and sacrificed through the ignorance of professors in the art and mystery of coach-building.

"It is more pertinent to the subject in hand to state dis-distinctly, and in few words, the objects which the patentee has in view; the *means* by which those objects are to be effected, and the *results* which those means are calculated to produce.

"The *objects* then, are, first, to equalize the weight; secondly, to diminish the friction; and, thirdly, to facilitate the *draught.* The means are, first, by a new construction of the wheels and box; secondly, by a new form of carriage and body; and, thirdly, by a new disposition of the points of draught. The *results* will be first to diminish expense; secondly, to increase speed; and, thirdly, to insure safety.

"In every point of view therefore, the proposed system may be contrasted advantageously with the existing one, which, strange to say concentrates within itself every possible disadvantage from the inequality of the weights, the increase of friction, the diminution of speed, the want of safety, and the cost of the carriage, no less in its new state than in the subsequent repairs to which an imperfect machine is of necessity liable.

"All vehicles are composed of four parts; first, the revolving or wheels; second, the directing or carriage; third, the containing or body; fourth, the drawing or shafts; and unless each and all of these parts are constructed according to the universal laws of matter at rest and in motion, the vehicle must needs be defective.

"Now the knowledge of the universal laws of matter at rest and in motion, is obtained only by observing the phenomena of matter at rest and in motion; and by reasoning upon the phenomena so observed we arrive at the following inferences, applicable as facts in a correct system of carriage building.

First, that the base of a body required to stand most firmly upon a level or inclined surface must be a square; second, that the sides of a body required to move most easily through a vertical fluid must be an ellipse; third, that the power of one body to support another, depends upon, not the quantity, but the union of the particles of

matter in the supporting body; fourth, that the power of one body to press another, depends upon the number of particles of matter in the former bearing upon not the different and distant, but the same or contiguous particles of the latter; fifth, that to move a body most easily, the moving power must be applied to the particles of that body, not detached from, but contiguous to its centre of gravity; sixth and lastly, that to move most easily two or more bodies connected together, their common centre of gravity must be in the parallel to that on which the bodies are to move.

"Of these facts not one seems to be known to coach builders, or if known not one has been adopted, at least in the case of carriages with three or four wheels; while the patentee, confident that what is right in theory cannot be wrong in practice, has been enabled, by directing his attention to parts disregarded by others, to construct vehicles upon principles that court inquiry and defy reproof.

"The patentee is not ignorant that various attempts have been made to correct the manifest and manifold errors of the present system of coach building. But as each improvement has been suggested only by a partial view of a particular defect, the result has been comparatively trifling, while in other cases the disadvantages of the alteration have more than counterbalanced its advantages, and the consequence has been the confirmed continuance of a system radically wrong, to be remedied by a radical reform alone; which can only then be certain and complete, when it is seen to be founded upon the unerring principles of geometry and mechanics united.

"After this general view of the theory on which the improved system of carriage building is founded, it only remains to show how improvements can be easily carried

into practice, which will be best understood by a reference to the drawings."

The patentee goes on to describe the construction of the bed or carriage part of his new invented vehicle, shewn in elevation in Plate XIII, at fig. 1. This carriage is to run upon four wheels placed in the form of a diamond; that is, two attached to one axle in the middle of the length of the carriage, running parallel to each other, on the opposite sides, and the other two before and behind in the central line under the carriage; the centres of these wheels, and of their axles being equidistant from each other. If the carriage is to run upon three wheels, they are to stand in the form of an equilateral triangle, the single wheel being behind.

Our limits will not allow us to enter into all the mathematical reasonings advanced by the patentee in his lengthened, learned, and laborious specification; we can only touch upon a few of the particular points which are said to be essential to the correct scientific construction of the whole.

The box in the nave of the wheel is to be formed hexagonally, as shewn in fig. 2, that the axle may only touch at points, in order to reduce the axle friction, and the angular spaces are to be occupied with oil.

The peculiar construction of wheels exhibited in the first figure with bowed spokes and fellies, are denominated *asteroide wheels*. It will be unnecessary to state all that the patentee has to say upon this peculiar form and construction, and the method of putting the spokes together, as the lateral support which one arch bears to another when so combined, and the consequent strength of the wheel must be self-evident. Fig. 3, shews the proposed method of tenanting the ends of the spokes into the nave.

"*Of the Rhomboid, or Four Wheeled Carriage upon the Aptole Principle.*—All the wheels are of the same diameter, the centres of the four wheels are so placed as to form the four angular points of a square, whose diagonal equals twice the diameter of one wheel. The side wheels revolve upon a common axle, rest upon the two side blocks, and upon these blocks the bed of the carriage is balanced.

"The fore and hind wheels are supported respectively upon two parallel bearers, placed at right angles to the plane of their own axle, whose bearing points are distant from each other by a space equal to one-third of the diameter of the wheel. Hence the length of the nave of the fore and hind wheels must decrease according as the thickness of the parallel bearers increases. The axles of the fore and hind wheels respectively rest in the sockets of arms attached to the under part of the parallel bearers, which are connected together at their ends by transverse segments.

"*Of the Peristriphic Movements.*—The direction of the carriage is effected by various peristriphic movements, applied to the fore and hind wheels, or by any other convenient means.

"*Of the Ellipsoide Body.*—To obtain the *maximum* of capacity with the minimum of draught, the length of the body must not be greater than three diameters and a half of one wheel, and to guard against the most distant danger of overturning, the width of the body at its centre must not be more than one diameter and two-thirds of one wheel, while the width at each end must not be more than one diameter and one-third of one wheel.

"*Of the Pyramidal, or Three Wheeled Car.*—All the wheels are of the same diameter. The centres of the three wheels are so placed as to form an equilateral triangle,

whose base equals twice the diameter of one wheel. The two side wheels are placed at the fore part, and the single middle wheel at the hind part of the car.

"*Of the Hyperbolic Shafts.*—The splinter bar is equal in length to the centre axle of the carriage, to which it is attached by arms thrown out from the ends of the parallel bearers. The pole is to be attached at right angles to the centre of the splinter bar, and united also to the transverse segment which connects the parallel bearers. In the same way, hyperbolic shafts are to be attached to the splinter bar, when the shafts are required to be applied instead of a pole.

"Of a carriage constructed upon truly scientific principles, all the parts do, and must bear a proportion to each other; and, consequently, the length of the pole, and the position of the points of draught, cannot be otherwise than fixed. But in practice it will be found, that if the carriage be very small or very large, the want of animals proportionally large or small, capable of drawing, will prevent the adoption of the hyperbolic shafts. The knowledge, however, of this fact neither has been, nor ought it to have been a bar to the patentee's promulgation of a correct system of shaft-building.

"Having thus described partially the theoretical, and fully the practical, part of the proposed improvement in carriage building, it only remains for me to state my claims.

"1. For the peculiar construction of the hexacycle axle box.

"2. For the peculiar construction of the asteroide wheel.

"3. For the peculiar disposition of three, or four wheels of the same diameter to a carriage.

"4. For the peculiar construction of the hyperbolic shafts adapted to three or four wheeled carriages."—[*Inrolled November*, 1827.]

To Benjamin Rotch, *of Furnival's Inn, in the City of London, Esq. for his having Invented a Diagonal Press for transferring Perpendicular to Lateral Pressure.*—[Sealed 22nd March, 1827.]

The subject embraced under this curious title is a contrivance to be attached to the top-mast of a ship. It consists merely of a swinging prop, pendant from the lower end of the top-mast, which prop being placed diagonally resting in a hole in the side of the lower mast, supports the top-mast, and takes off a considerable part of the weight from the cross-trees.

Plate XI, fig. 6, shews a part of the lower end of the top-mast *a*, and of the upper end of the lower mast *b*, seen sidewise; bearing the cross-trees *c*, *c*, in the ordinary way. *d*, is the common fid passed through a hole in the top-mast, and bearing upon the cross-trees, which with the tressle-trees and side-blocks support the mast, and receive the stress both of downward and lateral pressure.

The present improvement is a prop *e*, attached by a joint to the lower end of the top-mast *a*, which when out of action, hangs down in the position shewn by dots; but in supporting the mast, it is turned in the diagonal direction shewn in the figure, and its end passed into a hole or notch cut in the side of the lower mast: by which contrivance, the perpendicular pressure of the upper mast is transferred to a lateral pressure.

This contrivance may be employed in conjunction with

the improved fid, invented by the present patentee, and described in the Ninth Volume of our first series, page 177.—[*Inrolled September*, 1827.

To JOSHUA JENOUR, JUNR. *of Brighton Street, in the Parish of St. Pancras, in the County of Middlesex, Gentleman, for his new invented Cartridge or Case, and method of more advantageously enclosing therein Shot or other Missiles for the purpose of loading Fire Arms, and Guns of different descriptions.*—[Sealed 28th November, 1827.]

THIS invention originated in a notion that if the shots discharged from a fowling piece, could be kept together for a short time after they quitted the muzzle of the gun, that they would be more effective; that is, strike more collectively the object they were aimed at, than when fired after the ordinary method of loading, which allows the shots to disperse, and scatter to a considerable extent around the spot against which they were directed.

With this view a shot cartridge was constructed, by attaching together two semi-cylindrical cases of very thin copper, which being filled with shots were bound round by a string or fine wire. A considerable number of these cartridges were made, and submitted for experiment to a committee of gun-makers and sportsmen, members of the Society of Arts, the particulars of which we gave in the 13th Vol. of our first series, page 221.

It appeared, however, upon subsequent experiment, that the copper cylindrical case first adopted for holding the shots, did not answer the purpose sufficiently well; it was therefore found necessary to have recourse to another method, which forms the subject of this patent.

Plate XIII, fig. 4, exhibits a cylindrical cage, or receptacle mode of wire net work, twisted and woven together, by which the shots or other missiles are to be enclosed. This receptacle is to be placed within a paper case as at fig. 5, and the interstices between the shots filled up with dry sand, or bone dust, which will answer the purpose still better. This material is to be rammed hard, so that the shots may be kept tight within the cartridge, and wadding may be added both above and below the shots if required.

The other part of the cartridge case may be appropriated to contain gun powder, instead of loading from a flask, and the priming may be taken from the cartridge as in loading a musket, or the piece discharged on the percussion principle.—[*Inrolled May*, 1828.]

To JOHN ALEXANDER FULTON, *of Lawrence Pountney Lane, Cannon Street, in the City of London, Spice Merchant, for his invention of a Process of preparing or bleaching Pepper.*—[Sealed 26th November, 1827.]

THE object of the patentee is to remove the external skin or black coating from pepper, in order to render it white. The mode of effecting this object is by steeping the pepper in water for the space of a day, or more, sometimes a week may be necessary; and then placing a considerable quantity of it in a heap, so as to become heated; in which process the skins will very soon rot or become decomposed, and readily separate from the peppercorns within them.

The decomposed skins may now be removed by washing the pepper in water, and agitating it until all the black part is effectually washed off. The pepper is after this to

be dried by exposure to the air, or in any other way that may be found convenient for drying corn or seeds.

In order to bleach the peppercorns, after they have been treated as above, oxymuriate of lime may be employed, or it may be submitted to the fumes of sulphur.—[*Inrolled May*, 1828.]

To Francis Halliday, *of Ham, in the County of Surrey, Esq., for his invention of certain Improvements in raising or forcing Water.*—[Sealed 25th August, 1826.]

This is a sort of rotatory pump, constructed upon the same principles as the rotatory steam engine invented by the present patentee in 1825. See the XIVth Volume of our first series, page 197, and Plate XIV.

A wheel, carrying four vanes as pistons, works through the middle of a semi-circular chamber. One end of this chamber is open, and sufficiently wide to admit the broad faces of the pistons; the other end is closed, excepting at the narrow space through which the wheel passes edgewise and fits tightly.

The wheel is proposed to be placed horizontally, and to turn in that direction upon a vertical shaft. The semicircular chamber is, of course, horizontal also, and, with the wheel, is intended to be placed at the bottom of a well, or other reservoir, from which the water is to be raised.

The semi-circular chamber being immersed in the water, and open at one end, will of course be filled with water, and the vanes or pistons, as the wheel goes round, entering the chamber in succession, will shut in the volume of water immediately before it, and press the water

towards the closed end of the semi-circular chamber, where being unable to escape, it will rise in a perpendicular pipe leading upwards from that end of the chamber.

It has been said, that the semi-circular chamber, lying in a horizontal position at the bottom of the well, is open at one end, by which the water flows freely into it, but that it is closed at the other end, except a narrow channel through which the wheel passes edgewise, fitting the opening closely. Now each piston attached to the wheel in entering the open end of the semi-circular chamber, presents its broad face to the volume of water, and its edges fitting the internal part of the chamber closely, of course, the volume of water is driven forward by the piston, until the piston next following enters the chamber, and brings forward another volume of water, and so on. When the first piston has performed its duty, that is, brought the volume of water forward, an arm on the outside of the wheel, attached to the axle of the piston, strikes against a projection, and turns the piston round edgewise, which shuts it into the face of the wheel, and allows it to pass with the wheel freely through the narrow channel at the closed end of the semi-circular chamber.

In this way the successive pistons will continue as the wheel revolves, to drive the volumes of water along the semi-circular chamber, and, consequently, to force it up the perpendicular pipe, by which means the water will be continually rising from the well, or reservoir below, to the discharge-pipe above, and so pass off at a higher level.

It is scarcely necessary to add that the rotation of the wheel carrying the pistons may be effected by means of bevel gear at top, and which may be driven by a winch or by any other power.—[*Inrolled February*, 1827].

To Andrew Motz Skene, *of Jermyn Street, in the County of Middlesex, a Lieutenant in our Royal Navy, for his having Invented and found out an Improvement or Improvements in the mode of Propelling Vessels through the Water, and for working under-shot Water Mills.*—[Sealed 15th December, 1827.]

This improvement is a peculiar method of constructing and mounting the paddles or float board of a paddle wheel, for propelling ships and boats on water, or an under-shot water wheel of a mill.

Plate XI, fig. 7, is a side view of a water wheel, with six paddles or float-boards, intended for an under-shot water mill. The particular shape of the paddle or float board is shewn in fig. 8, which is a front view of one detached from the wheel. The paddle is of a semi-circular form at the lower part, and square above, with ears extending out on the sides. It is intended to be crossed exactly in the middle by the axis, upon which it is mounted, and supported in the two rims of the wheel, the lower part being weighted to double that of the upper, and to swing by its own gravity.

The arrow shows the direction of the wheel when applied to a water mill; *a*, is the paddle in the situation first acted upon by the water. It is kept in the radial position by the ears bearing against the arms of the wheel; *b*, is the perpendicular position of the paddle, and it is that part of the wheel's revolution which is most powerfully acted upon by the stream; *c*, is the paddle going out of operation, and is by the gravity of the lower part kept perpendicular, and enabled to rise out of the water with little or no resistance. The paddle *d*, is held in its po-

sition by the ears bearing against the internal parts of the rings of the wheel. The upper paddle *e*, is held in the same way, but by the time it has reached to the situation of *f*, the paddle has fallen over by its gravity, and the ears now bear against the arms of the wheel as in the first instance.

In the centre of the wheel there is a drum, the periphery of which nearly touches the backs of the paddles, as they turn over; the intention of this is to confine the water so as to make it act in the most effective way upon the paddles, in the event of its rising above the ordinary height, and which will also prevent in a great measure the inconvenience of back water.

The same construction of paddle wheel is applicable to propelling boats and other vessels on water, but in that case its action will be the reverse of that described above. It is recommended that these paddles should not be more than two feet wide; therefore if a wider wheel is required there should be several rings, and two or more series of paddles; and that there should be as many paddles round the periphery of the wheel as the wheel is feet in diameter. The drum too, or at least side plates in the same situation, will be of considerable advantage to the action of the propelling wheel, by keeping the water in its channel.

The patentee states that his claim of invention consists in the construction of the float boards or paddles in the peculiar shape exhibited, and in the proportions both as to size and weight of the two parts on the opposite sides of the pivots.—[*Inrolled June*, 1828.]

To WILLIAM PARKINSON, *of Barton-upon-Humber, in the County of Lincoln, Gentleman; and* SAMUEL CROSLEY, *of Cottage Lane, City Road, in the County of Middlesex, Gas Apparatus Manufacturer, for their having found out an Improved method of Constructing and Working an Engine for producing Power and Motion.*—[Sealed 1st August, 1827.]

THE power of this improved engine is to be obtained by the expansion and contraction of air, the temperature of which is to be suddenly raised or lowered in a certain vessel connected with the engine, called the *Differential* vessel, through the agency of a contrivance called a *Transferer*, by means of which the air contained within the differential vessel is transferred from the hot to the cold parts of the vessel, and *vica versa.*

The construction of the apparatus may be varied in several ways, to effect the production of a moving power upon the principle proposed, but one convenient mode of adapting it is shewn in Plate XIII.

The power of the engine will depend upon the degree of heat and cold applied to the differential vessel, and the density of the air within that vessel.

Figs. 6, and 7, shew the front and end elevations of so much of an engine as is necessary for explaining the invention; and fig. 8, is a section of the differential vessel, and the transferer detached. The differential vessel is a hollow cylinder *a*, *a*, closed with convex ends. This vessel must be of such a length as to preserve an essential difference in the temperature between the two ends; nearly one half of it being subjected to a hot, and the other half to a cold medium. There is a stuffing box *c*,

at the under part of the differential vessel, for the stem of the transferer *b*, to pass through; and at the upper part there is fixed a guide rod for the transferer to slide upon. A pipe also leads from the upper part of the differential vessel, communicating with the working cylinder and piston.

The transferer *b*, may be either solid or hollow, as may be thought most convenient, nearly fitting the interior of the differential vessel in its diameter, and corresponding in form with the top and bottom, but so much shorter as to leave a space for a volume of air, which when heated is to be driven through the pipe and valve *d*, at top, into the working cylinder.

A differential vessel, constructed in this way, may be applied to the working of a single stroke engine, the pressure of the heated air acting only on one side of the working piston, like an atmospheric steam engine; but in most instances, two differential vessels would be most desirable, acting reciprocally upon the opposite sides of the piston, like an ordinary double-stroke steam-engine.

The lower part of the differential vessel is immersed in a trough of cold water, *e*, *e*, which is continually flowing in at bottom, and out at top, in order to keep the lower part of the vessel as cool as possible. The upper part of the differential vessel is surrounded by flames, or volumes of heated air, or steam, enclosed by a double casing *f*, *f*. The inner part of the double casing is a surface of black iron, for the purpose of confining and directing the heat; and the outer part is of polished metal, to prevent the radiation of heat. Between this casing and the differential vessel, (when the apparatus is worked by the flame of gas,) a circular tube *g*, *g*, is introduced, embracing the vessel all round, which is to conduct inflammable gas from any convenient portable receptacle or other gas

holder. The circular tube is perforated, in order that the gas may pass out in jets, which being inflamed between the upper part of the differential vessel and its casing, will necessarily heat the air within the vessel. The transferers in the two differential vessels, shewn in fig. 6, are first put into reciprocal action in starting the engine by hand, and afterwards are kept in action by means of an excentric on the revolving shaft *h*.

This shaft being made to turn by the action of the engine when at work, causes the excentric alternately to raise and depress a rod *i*, connected to the vibrating beam *k*. The ends of this beam are respectively attached to the stems at the lower parts of the transferers, and consequently as the beam vibrates, the transferers reciprocally ascend and descend.

In starting the engine as represented at fig. 6, let it be supposed that the transferer in the left hand vessel, No. 1, is in its elevated situation, and that in the right hand vessel, No. 2, in its lowest situation; the volume of air occupying the upper or hot part of the vessel 2, will by its increased temperature have acquired great elastic force, while that at the lower part of the vessel 1, will be cold, and exert no force.

The heated air in the upper part of the vessel 2, being now allowed to pass from that vessel through a pipe and valve *l*, to the lower part of the working cylinder of the engine, it will there exert its elastic force, and raise the piston; by which means the parallel rods *m*, connected to the upper end of the piston rod will be raised also, and draw round the crank *n*, on the shaft *h*, which being governed by the fly-wheel gives the rotatory power of a first mover for driving other machinery.

The rising of the transferer in the vessel 2, causes the other transferer in the vessel 1, to descend, by which

means the cold air, which occupied the lower part of the vessel 1, will now be forced upwards between the sides of the transferer, and the differential vessel, in its passage acquiring heat, by passing in a thin strata against the heated surface of the upper part of the differential vessel, and ultimately becoming hot in the top of that vessel, as before described, whilst the transferer in the other differential vessel 2, as it rises forces the hot air from the top of the vessel past the sides of the transferer into the lower part, where it becomes cooled.

It will now be seen that the communication formed between the two differential vessels and the working cylinder through the pipes and valves *d*, and *l*, being open, that the volumes of hot air will act alternately upon the upper and under sides of the piston by the action of the transferers, thereby raising and depressing the piston in the manner above described, and that the difference of the elastic forces between the hot and the cold volumes of air will be the power exerted by the engine.

The patentees consider that the power of the engine would be increased by employing volumes of condensed air, and therefore propose to attach a forcing pump to the apparatus, for the purpose of injecting the air into the differential vessels, until it has acquired a sufficient degree of condensation. The supply of gas (if that should be employed instead of steam, or any other heating material) may be furnished to stationary engines, by pumping it through the agency of a gas meter and regulator,* from the street mains; or by portable gas vessels, if the engine is applied to locomotion. The cooling which has been described as performed by a current of cold water, may

* For a description of the patent gas regulator, invented by Mr. Cossley, see the tenth vol. of our first series, page 285.

be effected by any other convenient refrigeratory means, and the evolutions of the machine may be regulated by varying the supply of gas by a governor, and such other appendages as are usually adapted to steam-engines.

It is only necessary to add, that the patentees do not confine themselves to the forms of vessels described above, but propose to vary them in any way that may be found convenient.—[*Inrolled February*, 1828.]

Novel Inventions.

New Solar Compass.

At the last meeting of the Edinburgh Wernerian Society, a very interesting instrument was exhibited, the invention of Mark Watt, Esq. It may be thus briefly described: twenty-five needles of the size of No. 10, are rendered magnetic, and stuck at equal distances, into a thin circular piece of cork, of three inches diameter; this circle is affixed by a copper wire to a light bar of wood, five inches long, having at its opposite extremity a small weight equal to the weight of the needles. In the centre of the bar is an agate cup, which receives a fine steel point, on which the instrument traverses. Being secured from the action of the external air by a bell glass, and exposed to the influence of the sun's ray, the circle of magnetised needles points to the sun, and continue in that position, in opposition to the diurnal motions of the earth, as long as the sun is above the horizon. *Brewster's Jour.*

A Cement used in Spain, for the Preservation of Ships' Bottoms.

Charleston, S. C., March 10th, 1828.

Sir,—Although a distant subscriber, I have taken much

interest in the success of your very valuable Journal, so well calculated to convey useful information among practical men, like myself. The observations by Mr. Gill 'on various cements,' have brought to my recollection a circumstance which occurred some years ago, under my own observation; and I have thought that the publication of it might be of very material benefit to the marine department, and shipping interest of our country.

I am a practical shipwright, and have been constantly engaged in building and repairing vessels for twenty-eight years: in the year 1804, a large Spanish ship, which required considerable repair, arrived in this port, and was committed to my charge. On taking the old sheathing from the bottom, I found a coat of plaster, or chinam, which adhered so firmly, that it required considerable exertion to dub it off with the adze. It not only adhered to, but appeared to have become incorporated with, the main bottom; its hardness was about equal to that of soft marble, or plaster of Paris, in its natural state. This cement had been on the ship's bottom for many years; and the captain, an elderly man, who was a native of Biscay, in Spain, requested that a similar covering should be again applied; on my expressing my ignorance of the nature of the preparation, he offered with the assistance of the cook, to make the mixture for me, and desired that I would have two plasterers ready, with their trowels, to apply it, when the ship was in a state of readiness to receive it.

The composition he made as follows. The best barrelled stone-lime was taken, and slaked, by pouring on it just enough fresh water to produce that effect, and to cause it to fall into a dry white powder: this, when cooled, was sifted through a fine wire sieve, into a trough like a bread trough; there was then added to it, a portion of common fish-oil, sufficient to bring it to the consistence of soft

putty, so as to work with ease under the trowel. No water whatever was used, excepting that for slaking the lime in the first instance.

On the second day of sheathing, the plasterers had put on the width of two or three streaks, all fore and aft, more than we could cover, and this I concluded would wash off in the night, after we had righted the ship. The captain laughed at my fears, and said he would vouch for the cement being there in the morning; and, to my no small surprise, I found this to be the case. It had acquired a tinge of yellow, and was much harder than when put on, although it had been covered with the salt water during the whole night. The captain assured me that it would soon attain the hardness of that which had been removed.

The ship was one of about 450 tons, and, as nearly as I can recollect, the quantity of material used was about five casks of the unslaked stone-lime, and, I think, three sixty gallon casks of oil. I am not certain on this point, although I cannot err greatly; the consistence which the mixture must have, will be a sufficient guide for the proportions. In the process of making, and applying it, the information which I have given is perfectly correct. After it is prepared for use, it is kept in covered vessels to preserve it from the rain or other moisture. The ship's bottom is prepared for sheathing in the usual way, by being paid with a coat of good half stuff, and allowed to cool, before the plaister is put on, as this accelerates its adhesion to the main bottom.

Although it is out of my province, and I am therefore unable to form a judgment on this point, I have thought it worth inquiry whether this cheap cement might not be substituted for the costly Roman, or Dutch water cements. It would be worth the trial, whether it would not harden in fresh, as well as in salt water, and answer

the purpose of building piers, locks, and other structures under water.

If you think these remarks likely to be useful, please to insert them, and oblige,

Yours, &c. JAMES MARSH.

Franklin Jour.

Steam Carriage.

To several inquiries as to the progress of the steam-coach, we are compelled to reply, that there has not yet been any carriage exhibited, either publicly or privately, which warrants us in saying that the object is likely to be effected. EDITORS.

Rural Economy.

Cheap and Valuable Manure.

RAISE a platform of earth on the headland of a field eight feet wide, one foot high, and of any length, according to the quantity wanted. On the first stratum of earth lay a thin stratum of lime, fresh from the kiln; dissolve or slake this with salt brine from the rose of a watering pot; add immediately another layer of earth, then lime and brine as before,—carrying it to any convenient height. In a week it should be turned over, carefully broken, and mixed, so that the mass may be thoroughly incorporated. This compost has been used in Ireland, has doubled the crops of potatoes and cabbages, and is said to be far superior to stable dung.

The Pangros.

THE pangros hay plant, of Northern India, appears to be remarkable for its amazing produce, and its beneficial

effects when used as a food for cattle, while very little care is requisite in its cultivation. Two chests of its seed, and specimens of the pangros hay, have been forwarded to this country, and presented by the Hon. Court of Directors of the East India Company to the Horticultural Society; and though it is much to be regretted, that the vegetable power of the seeds had been so much exhausted as to render it doubtful whether they will grow or not, there is, however, reason to hope that speedier means may be employed to obtain seed, now that attention is called to the plant. The pangros hay plant is a perennial herbaceous plant, with a large fleshy root-stock, measuring six or seven inches in diameter, and formed by the aggregation of an immense quantity of crowns, or winter buds, clustered together, at or above the surface of the ground. These crowns are closely covered by the febrous remains of the old leaves, which must be effectual in protecting the buds from frost. From each crown rises an abundance of finely cut leaves, about two feet in length, and of a highly fragrant smell, well dried, similar to that of new clover hay. Mr. Lindley (judging from the specimen) supposes, that each plant will produce about a pound and a half of dry fodder; and, allowing each plant to occupy a space of about four feet square, the produce would be one ton three quarters per acre; and it is said to thrive on very inferior land.—*Quarterly Journal of Science.*

Indication of Decay in Trees.

M. Baudrillac has remarked the following sign, as always indicative of decay in trees:—When the top branches are withered, the decay of the central portion of the wood has commenced; but when the bark detaches itself from the wood, the progress of destruction has made

great advances. When the bark becomes loaded with moss or lichens, it is also a proof that the tree is in an unhealthy condition; but which may in some measure be overcome, by detaching these parasitical fungi from the surface. But if the sap flows out freely from cracks in the bark, it is a sign of early destruction of the tree. These observations are worthy the attention of the horticulturist and others.

Preserving Carrots.

An experienced farmer states, that having repeatedly grown carrots, he had tried several ways of preserving them, and had great loss by putting too large a quantity together, both in pits and buildings. The last two winters had been very successful: the plan he adopted (though it may not be the best) is the best he ever tried, which is, to put them in small pits, not more than three feet wide at the top of the ground, sloped to two feet wide at the bottom, eighteen inches deep in the ground, and six or eight yards long. Fill the pit half way up with carrots, thrown in promiscuously, (not regularly stacked) then throw a quantity of sandy earth in amongst the carrots; then more carrots; then more earth; then heap the carrots till the ridge is about eighteen inches above the ground; then cover them with a bolting of long wheat straw, and lay a great quantity of earth over the whole; beat it with a spade to keep the wet out. The earth running in amongst the carrots prevents their heating. They keep very bright till late in the spring, and by having them in small quantities it does not expose many at a time to the severity of the weather.

Polytechnic and Scientific Intelligence.

National Repository.

THE conductors of this newly formed institution have now opened their exhibition of Mechanical Art, the production of British genius and industry, in which a great variety of articles, both of curious workmanship and of novel application to the arts and manufactures, are displayed.

We cannot help regretting that the project was not entered into at an early period of the season, or that it had not been postponed until the next year, as the shortness of the time that the plan has been in agitation, could by no possibility afford an opportunity of forming a large collection of novelties; indeed, we feel that we are now informing many, for the first time, that such an establishment is really in existence.

With such patronage however, as the nobility and gentry have bestowed upon this first effort, and supported as it is by a daily concourse of visitors from among the first circles of society, as well as manufacturers and artizans, there can be no doubt but that another year will render the National Repository an exhibition of art worthy of its name.

We had originally proposed to furnish a complete series of notices illustrative of the contents of the gallery, but a reference to the first series of this Journal will shew that every patent invention exhibited, has already found a place in our pages. The very active Secretary, Mr. Tull, has by his persevering exertions, aided by the Committee of Inspections, completed a copious descriptive catalogue of the articles at present exhibiting in this establishment; and a perusal of its contents must be highly gratifying to every well-wisher of the arts and manufactures of this country.

Supply of Water to the Metropolis.

HAVING already fully examined the amount of water supplied to the Metropolis, we may now notice its quality.

On this branch of the subject, the Commissioners proceeded in two ways; they examined evidence as to the appearance and effects of the water; and they caused an analysis to be made of portions taken from the river, under different circumstances, and at different places.

Dr. James Johnson, of Suffolk-place, states, that the water of the Chelsea Company is very hurtful; that there is an oily scum on the top, and there are many pernicious substances dissolved in the water. He found the New River water, though turbid when it first came in, free from most of these exceptionable qualities.

The operator of the Apothecaries' Company described the New River water as being, after boiling and settling, fit for most medical purposes, but not for washing white precipitates.

John Dill, M.D., gave a favourable account of the New River water; and Mr. Starkey gave the same of the East London; the Secretary of the London Hospital, however, mentioned the appearance of shrimps and other insects in the latter. The Clerk to Mary-le-bone workhouse spoke to the general good qualities of the water supplied by the the West Middlesex Works; and Mr. Luckie, a fishmonger, described it as being well adapted for the preservation of live fish; the only fault being that it is sometimes a little thick. The apothecary to the Middlesex Hospital gave a favourable account of the water supplied by this company.

One of the proprietors of Hatchett's Hotel described the water of the Grand Junction Company as wholly unfit for use, the deposited mud having a very offensive smell

—the water abounded in insects, and an eel, three-quarters of a pound weight, has been taken out of one of the pipes. In consequence of the offensive state of the water supplied by the company, the proprietors of this large establishment sank a well to the depth of about three hundred feet; the strata through which they passed were 14 feet of gravel, 230 feet of blue clay, 14 feet of red, 4 feet of black soil like peat, containing large shells, and lastly, a mixture of green sand and red clay, from which the water came to within no great distance of the surface. The water from this great depth was found to be as soft as Thames water, and to decompose soap fully as well.

The landlord of the Blue Posts, in Cork Street, described the water supplied by the Grand Junction Company as containing half a table spoon full of black mud in two quarts, sometimes having an oily scum on the surface, and as being unfit for most domestic purposes. Mr. Goodhugh, a fishmonger, and Mr. Downs, an oyster-merchant, represented the water of the Grand Junction Company as destructive both of the life and the good qualities of fish. Mr. Hall described the water of the same company as having a smell of putrid animal matter, which is not removed by boiling, and as being injurious to the health of the females employed by him in his business. Mr. Cotterell of the Waterloo road, Mr. Hadunt, Mr. Carr, Mr. Wright, and Mr. Punchen, represented the water supplied by the Lambeth Works as being very foul and offensive.

A number of witnesses spoke of the badness of the Southwark water. It is thick like pease-soup, deposits three or four inches of mud in a fortnight, contains periwinkles, shrimps, and various other insects, and often has a very offensive smell.

The general scope of the evidence adduced on the state of the water, as supplied from the different works, tends to establish the following points:—

That water taken from the Thames, at any point below Chelsea Hospital, is less pure than that taken from the Lea, or the New River.

That the quality of the water taken from the Thames, depends a good deal upon the nature of the bottom where it is taken, and also upon the proximity or distance of common sewers. The water taken by the South London Company at Vauxhall, being more free from impurities than that taken farther up by the Chelsea and Grand Junction Companies; and that taken by the latter of these being the least pure, though taken furthest up the river, probably from the proximity of that company's dolphin to the great Ranelagh sewer.

That water taken from near the surface of the Thames is less contaminated than that supplied from the bottom. The water raised by the wheels at Old London Bridge being better than that now drawn in the vicinity. Besides the evidence as to the state of the water served by the companies, witnesses were examined with regard to the general state of the Thames; all these witnesses concur in representing that water as being more foul and deleterious than it used to be.

It was stated by the Yeoman of Billingsgate that formerly four hundred boats were constantly employed in fishing in the Thames between Deptford and Richmond; that 10,000 salmon were sometimes caught in a season, and 50,000 smelts in a day, but that within the last fifteen years, (chiefly since the great use of gas,) the number of boats has diminished one-half, the trade is unprofitable for the remainder, and there are now no salmon caught. The causes to which he attributes the deterioration are

the additional quantity of impurity discharged by the sewers, since the whole soil of the metropolis was washed down by these; the refuse of the gas works which is discharged during the night, and floats on the surface in patches like oil; and the stirring up of the mud in the bed of the river, by the action of steam boats. Several witnesses declared that they had seen the fish attempting to escape the effects of this fluid, by leaping upon any bit of wood that happened to be floating on the river; and the traders in eels from Holland complain, that from about Woolwich to Billingsgate, they are often overtaken by "bad water," which makes their eels first jump up in great agitation, and then die. After death they become spotted, and the wells in which they are kept smell strongly of gas. The evidence of several fishmongers went to shew that live fish cannot be kept in water drawn from the Thames below Chelsea Hospital. Of the cargoes of eight Dutch vessels, containing 100,000 pounds of healthy eels that arrived at Gravesend in the month of July, 1827, 67,500, or more than two-thirds of the whole, died before they could reach the market. Twelve years previously, there never was a loss of more than thirty pounds in one night; but now a vessel will lose her whole cargo, about 14,000 pounds in a single tide, and when the weather is calm and fine.

From the evidence, we may infer that no great portion of this oily matter, which is so hurtful to fish, gets into the pipes of those companies that draw their supply from below the surface; but, from the fact that the water sent by these companies also poisons the fish, even eels that can live buried in mud, one must also infer, that, independently of this floating substance, there must be in the water, and most likely chemically dissolved in it, and therefore inseparable by any filtration, some substance

fatal even to the sluggish and retentive life of eels, and therefore injurious to the human system. With a view to discover this, the Commissioners proceeded to

The Analysis of the Water.—Specimens of the water taken at different parts of the river, and under different circumstances, were severally examined by Dr. Bostock, by Dr. Lumlie, and by Dr. Pearson, and Mr. Gardiner. The analysis is long and minute, so that we can only state some of the results; and we may remark, in limine, that, notwithstanding the ability of the examinators, and the attention which they bestowed upon the examinations, we are not sure but the most deleterious part may have escaped in the early stage of the process, that was slow evaporation in open vessels, during which decomposition of the organic matter probably took place: as, while the process was going on, Dr. Bostock remarks that a nauseous odour, resembling that which proceeds from foul drams, was given out by the water. We are inclined to think that much of the injurious qualities of the water consist in the fœtid gases, and in the process by which they are eliminated; and to them, may be attributed the is unpleasant accompaniments to a dwelling house in warm weather.

Four of the most impure specimens, remitted to Dr. Bostock, were from the Grand Junction at low water, the New River engine at half ebb, the same at high water, and the Lambeth at high water. "There were," says Dr. Bostock, "two obvious varieties of extraneous matter. What appeared to be in the greatest quantity resembled masses of floculent matter, which seemed composed of a fibrous substance, probably of vegetable origin; the next most abundant ingredient was like minute with scales, similar to what are often exfoliated from the cuticle; these were much longer than the fibrous mat-

ter in subsiding, and were again mixed with the water by a slight agitation. Besides these, there were bodies resembling the exuviæ or larvæ of insects; and in one specimen there were masses of white fibres radiating from a centre, like the patches of mould that are formed on some paste or jelly.

Each of the specimens above enumerated, contained 8-10ths of a grain of solid residuum from sixty cubic inches of water. The saline contents of the most pure and the most impure were nearly the same. Those of a specimen (the purest of the whole) taken at the West Middlesex engine, at low water, were :—

	Grains.
10,000 grains left on evaporation	1.95
Carbonate of lime	1.53
Sulphurate of lime	0.15
Muriate of soda and of magnesia	0.20
Organic Matter	0.07

The products of the same quantity of one of the foulest specimens, taken from the Lambeth engine at high water, were as follows :—

Carbonate of lime	1.55
Sulphurate of lime	0.12
Muriate of soda and of magnesia	0.23
A trace of alumine and of armonia . .	——
Organic matter	2.02
Total in 10,000 grains	3.90

From the comparison of the best and worst specimen in the following table, it appears that the chief difference in the impurity consists in the organic matter; the quan-

tity in the latter being more than ten times that in the former. It further appears that the kind of organic matter varies with the cause of impurity, near which the water is taken up, being more vegetable at Bankside, where there are many timber-yards and saw-mills, more animal near the great common sewers, and having a sourish taste at the Lambeth engine, in the vicinity of the great lead works.

List of Patents

GRANTED IN THE UNITED STATES OF NORTH AMERICA, 1827, FOR INVENTIONS AND IMPROVEMENTS.

(*Continued from page* 188.)

In the machine for setting up hat bodies, Joseph Grant, Providence, R. I. April 10.

In the water wheel for steam boats, Robert L. Stevens, Hoboken, N. J. April 10.

In making tenons on spokes for wheels, David Sperry, Colchester, Conn. April 18.

In the spinning machine, Nathaniel Remington, Geneva, N. Y. April 21.

In all kinds of propelling machinery, William Staunton, Centre Township, Indiana, April 23.

In the turning lathe, William Patrick, Leverett, Mass. April 24.

In the steam engine, George Fleming, Goochland, C. H. Va. April 24.

In preserving eggs, butter and lard, Thomas Edmundson, Pipe Creek, Md. April 26.

In the manufacturing of wool, John Goulding, Dedham, Mass. April 27.

In making clay tubes, John R. Rowell and Henry Wire, Fredericktown, Penn. May 10.

In the scraper, or team shovel, G. Davis, and J. Price, Lockport, N. Y. May 12.

In the steam engine, E. A. Lester, Boston, Mass. May 14.

In stocks, Joseph Towson, Baltimore, May 14.

In the mill for grinding paint, Allen Holcomb, Butternutts, N. Y. May 14.

In the mode of extracting oil by steam, David Dodge, Hamilton, Mass. May 14.

In marine rail-ways, Joseph Webb, New York, May 14.

In a safety gate for canals, Jacob Van Dorn, Glen, Montgomery County, N. Y. May 14.

In the valve cock, for hydrants, Benjamin Stancliff, Philadelphia, May 15.

In the cotton press, Richard Jarnigan, Waynesborough, N. C. May 15.

In the horizontal piano-forte, Thomas Loud, Philadelphia, May 15.

In the employment of heated air, in aid of steam power, Minus Ward, Baltimore, May 15.

In funnel stoves, Hiram Wales, Randolph, Mass. May 18.

In the cast iron plough, Robert Sweeny, Warren County, Ohio, May 18.

In the machine for cleansing wheat, rye, &c. John Tyler, Claremont, N. H. May 18.

In carts for removing earth, Jeremiah Prince, Lockport, N. Y. May 18.

In the churn, Levi Rosencrans, Urbana, N. Y. May 19.

In the machine for crushing corn with the cob, S. K. Gauntt, Greenville, Tenn. May 25.

In a water-proof stiffening for hats, Stephen Hempstead, jun. Charles County, Md. May 25.

In the thrashing machine, M. Pennock, Kennet Square, Chester County, Penn. May 26.

In the mode of letting water on the water wheel, Robert and Thomas T. M'Culloch, Albemarle County, Va. May 26.

In the evolution and management of heat, Eliphalet Natt, Schenectady, N. Y. May 30.

In mills for grinding grain, Abraham Delap, and Avery Coe, Guildford, N. C. May 31.

New Patents Sealed.

To John Baring, of Broad Street Buildings, in the City of London, Merchant, in consequence of a communication made to him by a certain foreigner residing abroad, for an invention of a new and improved mode of making or manufacturing machines for cutting fur from skins for the use of hatters, to be called "Cant Twist Blades Fur Cutter."—3rd July, 6 months for inrolment.

To John Johnston Isaac, of Star-street, Edgware Road, in the County of Middlesex, Engineer, for his invention of improvements in propelling vessels, boats, and other floating bodies.—5th July, 6 months.

To Thomas Revis, of Kennington Street, Walworth, in the County of Surrey, Watchmaker, for his invention of an improved method of lifting weights.—10th July, 6 months.

To John Hawks, of Weymouth Street, Portland Place, in the County of Middlesex, Iron Manufacturer, for his having found out and invented an improvement in the construction of ships' cable and hawser chains.—10th July, 6 months.

To John Henry Anthony Gunther, of Camden Town, in the County of Middlesex, Piano Forte Manufacturer, for his invention of certain improvements on piano fortes. 10th July, 2 months.

To William Muller, of Doughty Street, Bedford Row, in the County of Middlesex, Captain of our German Legion, for his having invented an instrument or apparatus for the purpose of teaching or instructing in mathematical geography, astronomy, and other sciences, for the use of resolving problems in navigation spherics, and other sciences.—10th July, 6 months.

To Benjamin Rider, of Redcross Street, Southwark, in the County of Surrey, Hat Tip Manufacturer, for his invention of certain improvements in the manufacture of hats, which he intends to denominate Rider's patent hat tip.—17th July, 6 months.

To Joseph Jones, of Amlweh, in the County of Anglesea, in North Wales, Gentleman, for his invention of an improvement in certain parts of the process of smelting, or obtaining metallic copper from copper ore.—17th July, 6 months.

Meteorological Journal kept at the London Institution.

DATE.	TIME.	BAROM.	Thermometer. IN.	Thermometer. OUT.	WIND.	REMARKS.
JUNE. 30	9	*See note	67	64·0		
	3		69	65·0		
JULY 1	9		68	64·0		
	3		70	68·0		
2	9		68	66·5		
	3		72	74·4		
3	9		69	68·8		
	3		73	75·5		
4	9		74	73·0		
	3		76	74·5		
5	9		74	70·0		
	3		75	72·0		
7	9		75	72·5		
	3		73	69·5		
8	9		71	67·4	W.	Fine
	3		73	70·8	E.	Ditto
9	9		70	65·2	N.—N. W.	Ditto
	3		71	70·0	W.	Stormy
10	9		67	59·0	W.	Ditto
	3		72	72·4	N. N. W.	Fine
11	9		67	75·8	S. W.	Ditto
	3		70	76·5	S. W.	Ditto
12	9		72	62·2	S. W.	Rain
	3		60	61·0	N.—N. W.	Ditto
14	9		62	62·8	N.	Ditto
	3		63	60·4	S.	Ditto
15	9		64	60·2	N.—W. N.	Cloudy
	3		70	64·4	S. W.	Fine
16	9		70	63·0	S. W. W.	Cloudy
	3		70	60·5	N.—N. W.	Ditto
17	9		66	64·4	S. W.	Ditto
	3		68	66·8	S. W.—W.	Ditto
18	9		68	65·4	S. W.	Ditto
	3		70	68·4	S.	Ditto
19	9		70	68·0	S.	Ditto
	3		71	72·0	S. W.	Ditto
21	9		66	63·8	S.	Cloudy
	3		69	67.0	S. W.	Rain
22	9		64	60·2	S. W.—W.	Cloudy
	3	29·60	66	64·0	S. W.	Showers
23	9	29·65	67	66·5	S. W.	Cloudy
	3	29·65	66	64·4	S. W.	Rain
24	9	29·60	67	62·2	S. W.	Ditto
	3	29·62	69	66·8	S. W.	Ditto
25	9	29·60	67	64·5	S. W.	Fine
	3	29·65	67	65·6	W.—S. W	Cloudy
26	9	29·70	68	66·5	S. W.	Ditto
	3	29·72	68	65·5	S. W.	Ditto

* An accident happened to the Barometer, which prevented any observation being made on this, and the following days.

CELESTIAL PHENOMENA FOR AUGUST, 1828.

D.	H.	M.	S.	
1	0	0	0	Clock before the ⊙ 5' 57"
1	1	0	0	☾ in conj. with ο in Pisces.
2	3	38	0	☾ in ◻ last quarter.
3	0	0	0	☿ Stationary.
3	0	0	0	♂ Stationary.
4	2	0	0	☾ in conj. with 1 θ in Taurus.
4	2	0	0	☾ in conj. with 2 θ in Taurus.
4	4	0	0	☾ in conj. with ε in Taurus.
5	0	0	0	Clock before the ⊙ 5' 38"
6	8	50	47	♃'s 2d Satt. will emerge.
9	14	0	0	☾ in conj. with 1 α in Cancer.
9	15	0	0	☾ in conj. with 2 α in Cancer.
10	0	0	0	Clock before the ⊙ 5' 1"
10	4	42	0	Ecliptic conj. or ● New Moon.
13	2	0	0	☽ in conj. with ν in Leo.
15	0	0	0	Clock before the ⊙ 4' 10"
16	11	0	0	☽ in conj. with λ in Virgo.
16	15	0	0	☿ in conj. with θ in Cancer.
16	17	0	0	☽ in conj. with ♃. Long. 8° in Libra. ☽ lat. 1° 43' N. ♃ lat. 1° N. diff. lat. 43'
17	21	υ	0	☽ in conj. with 4 ζ in Libra.
18	0	0	0	♀ Stationary.
18	2	46	0	☽ in ◻ first quarter.
18	6	0	0	☽ in conj. with δ in Libra.
20	0	0	0	Clock before the ⊙ 3' 6"
22	17	36	0	⊙ enters Virgo.
22	18	0	0	☽ in conj. with β in Capri.
24	8	8	33	♃'s 1st. satt. will emerge.
24	16	0	0	☾ in conj. with δ in Aquarius.
24	17	28	0	Ecliptic Opposition, or ⊙ Full Moon.
25	0	0	0	Clock before the ⊙ 1' 49"
27	15	0	0	☾ in conj. with ε in Pisces.
27	20	0	0	☾ in conj. with ζ in Pisces.
28	10	0	0	☾ in conj. with α in Pisces.
28	10	0	0	☿ in conj. with α in Leo.
30	0	0	0	Clock before the ⊙ 23"
31	9	0	0	☾ in conj. with 1 θ in Taurus.
31	9	0	0	☾ in conj. with 2 θ in Taurus.
31	16	38	0	☾ in ◻ last quarter.

☽ The Waxing Moon.—☾ The Waning Mon.

Rotherhithe. J. LEWTHWAITE.

METEOROLOGICAL JOURNAL, FOR JULY AND AUGUST 1828.

1828.	Thermo. Hig.	Thermo. Low.	Barometer. High.	Barometer. Low.	Rain in inches.	1828.	Thermo. Hig.	Thermo. Low.	Barometer. High.	Barometer. Low	Rain in inches.
JULY						AUG.					
26	79,5	50	30,29	Stat.		11	70	55	29,86	Stat.	
27	80	49	30,20	30,10		12	59	57	29,52	29,48	,4
28	79	58	30,02	30,00		13	60	50	29,45	29,39	
29	78	53	29,91	29,90		14	65	48	29,46	29,45	
30	79	40	29,91	29,90		15	70	50	29,49	29,44	
JULY						16	75	45	29,71	29,66	,05
1	74	49	29,87	29,85		17	74	55	29,66	Stat.	,025
2	78	60	29,84	29,82		18	73	55	29,58	29,55	
3	83	60	29,83	29.82	,025	19	70	55	29,49	29,48	,075
4	73	63	29,83	29,76	1,0	20	64	47	29,43	29,30	
5	76	62	29,85	29,84		21	67	51	29,50	29,41	,65
6	72	50	29,81	29,80		22	66	48	29,57	29,44	,4
7	73	50	29,85	29,75	,075	23	70	53	29,63	29,57	,025
8	78	46	29,70	29,60	,025	24	60	54	29,61	29,58	,2
9	68	59	29,68	29,52	,375	25	68	56	29,54	29,51	,4
10	70	52	29,81	29,61	,175						

LOWER EDMONTON CHARLES H. ADAMS.

Lat. 51° 37' 32" N Long. 3' 51" W. of Greenwich.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. VI,

[SECOND SERIES.]

Original Communications.

ART. XXIII.—ON ORNAMENTAL TURNING. BY M. H. SHUTTLEWORTH, ESQ.

To the Editors of the London Journal of Arts, &c.

GENTLEMEN—Perhaps no mechanical art has of late years so widely extended its application and acquired so many admirers as that of turning.

From the superb boudoir of beauty, the splendid toilet of the man of fashion, the study of the artist, the library of the student, the cabinet of the virtuoso, the nicely finished instrument of the mathematician, the polished apparatus of the optician, the laboratory of the chemist, the engine-turned chronometer of the watch-maker, the bijou of the jeweller, and the manufactory of the engineer, —from the magnificiently finished machine furnished with every improvement ingenuity can devise, and adorned

with every embellishment wealth can purchase of the amateur turner, to the mechanic, who gains his living by his undecorated lathe, to the humbly furnished cottage of the labourer, the loom of the weaver, and the implements of the agriculturist, this art is in universal request.

While, therefore, it is easily imaginedt hat the professors of the art should have exhausted their skill, and taxed the utmost extent of their talents in its improvement, and that treatise upon treatise have been published concerning it, it is not quite so easy to comprehend why, while the expence attendant upon the cultivation of every other mechanical and liberal art have been materially reduced, no attempt has yet been made to place within the reach of the operative turner, those more elaborate requisites for the ornamental purposes of the art, at present, from their high price, attainable alone by the wealthy workman or amateur.

It is in the hope of inducing some abler person than myself to exert his powers to the accomplishment of so desirable an end, that these papers have been commenced, in which it will not be my object to attempt originality of invention, but merely to describe simple modifications of a present complicated apparatus, which, although they cannot be expected to delineate all the beautiful figures of Mr. Ibbetson's elaborate engines, will at least enable the mechanic to embellish his workmanship with ornaments hitherto, from the expense requisite, placed far above his reach.

The descriptions will all be taken from models either executed by myself, or under my own immediate inspection, and which will be readily exhibited to any person desirous of further information. Of these, an eccentric chuck and slide rest upon the most simple principles and reasonable construction, are now ready, and will be con-

secutively described, with appropriate drawings, and followed by an account of an oval chuck and rose engine, as soon as the leisure snatched from professional pursuits will permit me to devote such attention as the subject requires.

It is of primary importance to the comprehension of the following papers, that the mathematical principles of eccentric turning should be first perfectly understood, which may be explained by a simple figure, see Plate XV.

Let *c*, fig. 1, be the mandrel screw of a common lathe, on which is fixed *a*, *b*, the lid of a box intended to be ornamented by a border of circles *e*, *f*.

Now it is plain that by placing a tool at any given point, say *g*, and causing the lid to revolve by communicating a rotatory motion to *c*, a circle will be described, of which *c*, will be the centre.

Upon this axiom the whole theory and practice of plain and ornamental turning rests.

To describe the border of circles, a little reflection will enable us to ascertain that the central point of each circle, say *d*, must be discovered, and *c*, screwed behind it; then it will be evident (that *c*, no longer remaining at the centre of the lid, but being placed behind *d*,) by the revolving motion of *c*, the point *a*, will no longer describe the circle *a*, *b*, but the larger one *a*, *h*, of which *d*, will be the centre; place therefore a tool at *i*, and the circle *i*, *k*, will by turning *d*, be described, of which *d*, will be the centre.

The principle being understood, its application will be easily comprehended. It is very evident that the necessity of finding a new centre for every circle, and the consequent frequent re-chucking the work, would amount to an effectual prohibition of the use of such troublesome em-

bellishments; but supposing it contrived that the work would slide off *e*, in the direction *b*, *c*, *a*, till the point *d*, came opposite *c*, the requisite centre for the circle *i*, *k*, would then be found, and this is in the eccentric chuck thus effected.

In the face of the plain cylindrical chuck *e*, fig. 2, is accurately fitted a slide *f*, moving between parallel cheeks by means of a screw and nut *l*, *m*, in the centre of *f*, is placed a chuck screw *n*, the threads of which correspond with the thread of the mandrel screw *c*, and on *n*, by chucks or otherwise, is fixed the work to be ornamented, say a box lid *a*, *b*.

Now, supposing *n*, to be brought opposite *e*, a chuck may be screwed on *n*, by which plain circular work may be turned, but by forcing the slide *f* up, whatever point of *a*, *b*, comes opposite *c*, such point becomes the centre of a new circle, say *d*.

But supposing the screw *n*, to be fixed in *f*, it is apparent that to execute the circular border, the lid *a*, *b*, must be turned round in its chuck for every circle; to obviate the necessity of which, *n*, is so fixed in *f*, as to revolve freely until a click *p*, fixed by a pivot on *f*, catching in the teeth of a ratchet wheel affixed to *n*, confines it.

The use of this wheel and the relative proportions of its teeth, will with its concomitant appendage, the slide rest, form the subject of the next paper, in which will also be described the easiest and cheapest methods of manufacturing them.

Tottenham, August 20th, 1828.

Art. XXIV.—On the Invention of Money, and by whom, in the earliest Ages of the World. By B. Cook, Esq.

To the Editors of the London Journal of Arts, &c.

Gentlemen—When I commenced my review of the invention of money, it was my intention, simply to have endeavoured to trace its progress, and the use of it, from its source, down to the present time, by the various nations of the earth; and described the manifold changes it has suffered, before it had attained to its present perfection; when the ingenuity of man has enabled him to extract from gold, if I may be allowed the expression, its essence and spirit, and to give to a single piece of paper a value equal to the revenue of a kingdom.

But I find that in doing so I cannot avoid connecting in some degree with it the progress of civilization, of art, and science; as well as some of those events which have produced revolutions and changes, that have disturbed and agitated the world. But these events, produced by the insatiable ambition of man for conquest and extent of territory, has been one of the chief causes of the wide circulation of money. To the inquiring reader, and the man of science, such information cannot be uninteresting.

I shall now proceed with the Scythian nation, and prove its great antiquity, as the nation that not only invented money, but idols also—whose empire extended all over Asia.

The armies of the Scythians were the most ancient of any on record; their conquests extended to the Nile, and returning, brought Asia under subjection to their power. Their empire preceded that of the Assyrians by 1500 years.

Let us then for a moment pause to inquire, what must have been the numerical strength of these great armies, which were employed for fifteen years in subjugating all Asia, before they were able to establish a regular and peaceful government, and render tributary a country extending over 1000 leagues, which these great masses of soldiery must have traversed. It must strike every thoughtful mind, that it was impossible such armies could have subsisted if they had not had money, or something equivalent, to give for those articles necessary for their support.

The invention then, of money, the greatest blessing and the greatest curse ever introduced upon the earth, must be given to this people. If *Indus*, king of Scythia, was the first inventor, he must have reigned prior to the conquests made by the Scythians in Asia, 1500 years before Ninus, who began his reign* 2110 years before Christ. This prince must have improved the value of money, as he did that of the weapons of war, for he used in his battles chariots armed with scythes: and Semiramis, who succeeded him, carried her conquests into India, where she found a hostile people, used to war and battle: for *Stabrobates*, according to the Indian chronicles, who was the seventieth king in succession from Bacchus, led forth his armies to oppose her, in which he had a great number of elephants, armed with breast-plates. All these accounts, tend to show, that civilization and the arts had made great progress at this early period of time, and that money must have had a wide circulation, and a fixed value put on it. But, if this supposition is true, as stated by some

* Chronologists have not agreed as to the period when Ninus and Semiramis lived. Some place them about nine hundred years later than the time above stated, consequently the great antiquity presumed is extremely equivocal.

EDITOR.

historians, there must have circulated in Asia money under the forms I have before described 3610 years before the birth of Christ; and this early time, to which we are able to ascend to, in order to fix the existence of money, preceded by 400 years only the institution of the astronomical period in Persia, whose kings were tributary to the Scythians. This period commenced 3209 years before our era.

Astronomy, it appears, was known almost as early in China, which still preserves the oboliscal form of the money invented by Indus. In mentioning these dates I merely quote from early writers, without vouching for their correctness; because I am aware, that by doing so I am describing science and art as making great progress in Asia, many ages before the time chronology has fixed as the period of the universal deluge.

Nevertheless, it is very certain that the arts and sciences had arrived at great perfection at a very early period in Asia, as proved by the great number of monuments still remaining, and the immense ruins which still exist, many of which are attributed to Ninus, and Semiramis his wife, in various parts of the East.

When the Scythians invaded Tartary, they introduced into that country, not only money, but their worship also; which was that of the Bull, the emblem of life and power, and their monies had on them the figure of a triangle formed of three crescents; and this same emblem we find upon some of the early coins and medals of Greece, but especially upon the medals of Delos.

The Turks derived their origin from the Tartars, who were descendants of the ancient Scythians, who still retain on their standards the crescent, the emblem of the worship of Tartary, and what was originally impressed upon their money. The same figure of the triangle is found on the ancient

monies of Tibet, but it is formed of three globes. The money of this country was struck at the capital city *Lapsa*, the seat of the grand Lama, the Pontiff King, who has always styled himself *The Vicar of God.*

The great length of time this religion has remained unchanged in Tibet is astonishing, as the monuments and records of that country, which appear correct, describe the Pontificate of the Lamas, by an uninterrupted succession of sovereigns, from *Prafrinmo*, who lived 1340 years before Christ, 131 years before the time that the Arundelian marbles fix for the siege of Troy, and seventeen years after Janus carried the use of money into Italy.

Ninus was contemporary with Terah, the father of Abraham. Terah lived in Chaldea, and had idols made of earth, which he and his family worshipped, which was the religion of the Scythians, and the only religion then practised. Laban worshipped the same idols in Syria, and some of these idols were oftimes only a large oboliscal stone, the form of their money, like the stone that Heliogabalus made himself the priest of. This stone was a representation of a ray of light, emblem of the sun.

Art and science must have been making great progress in Syria at the time of Laban, for the idols he worshipped represented a part of the human form, and were called Teraphines, like those that the wife of David placed in the bed of her hubsand. Many of these idols had the head of a bull upon the body of a man, others the head of a goat: it was the worship of Bacchus, and originated with the Scythians.

In the time of Jacob, the ear-rings of gold worn by the females of his house were many of them made of the human shape, or parts of the human figure; these appear to have been considered by the patriarch as idols, which he took and buried, with other objects of worship, under

an oak at Sychem. Money, therefore, must have been in circulation at this period, to purchase these articles of idolatory and decoration.

About the time that Cecrops reigned in Athens, Aaron made the golden calf, and raising an altar offered sacrifices to it. This was the worship of Egypt, as well as that of the ancient Scythians; and the great symbol of this worship was the Bull, which still exists in India, Japan, and China: it was the worship of Bacchus, the idolatory that had spread itself all over the world, the Baal Peor of the Holy Scriptures. This golden calf was set up near mount Sinai, where the worship of Bacchus was practised, under the figure of a Bull; and the notice given by Aaron to hold the fête, according to Seldon, was *Festum Adonai Cras.*

Engraving, as well as statuary, seems to have been well known at this early period, for we find that Moses caused to be cut the names of the ten tribes upon two onyx stones, which were set in gold; and these names were repeated by *Aholiab*, the most ancient engraver known, upon twelve precious stones, which were set in gold, and placed upon the bosom of the High Priest. This happened almost a century before Erichthonius gave money to the Athenians, therefore its use must have been known among the Hebrews, long before his time.

The time that Moses constructed the Tabernacle was 1595 years before our era, thirteen years before Cecrops reigned in Athens, which is proved by the Arundelian marbles, Epoch 1st,—and 1582 before Christ, and according to Eusebus, the 69th year before the commencement of the reign of Erichthonius, which began about eighty-two years after the construction of the Tabernacle.

We thus see that the Hebrews had money in circulation then, for in Exodus, 30 chap. 13 verse, they are described as

giving each, as an atonement for his soul, half a *Sheckel* of the weight of the sanctuary of the value of ten *Gerahs*. Now this money, called *Gerah*, is valued by learned men as equal to the Obole. Money, therefore, appears to be brought more early, to perfection among the Hebrews, than even it was among the Greeks, when they received the invention from the Scythians, among whom it appeared in its primitive simplicity; and which ancient form, as I have before stated, still remains in some instances in Japan, China, and Arabia.

In pursuing my inquiry, on the subject of money, and to account for the impressions or symbols found upon it, I find it necessary to mention the cosmogony of Japan, which was also that of many other nations. According to this cosmogony, the world before the creation was inclosed in an immense egg, which floated upon the face of the mighty waters, which the sacred Bull, the emblem of life and almighty power, struck with his horns, and breaking in pieces the shell, the world appeared. This event *Orpheus*, in one of his hymns, describes, in speaking of *Cahos*, which may be thus rendered:—"Eternal, without bounds;—not created—but from its bosom all things were produced;—it was neither darkness, nor light, nor humidity, nor dryness, nor hot, nor cold,—but all mingled together, under the form of an immense egg."

Now this symbol of the Bull was struck upon the coins of almost all nations, and in Greece alone more than 600 medals of different cities have this emblem represented upon them. When the Scythians marched forward to the conquest of Asia, it was the statue of the Bull they carried before their armies, as the God who would conduct them to victory;—and when those vast masses of people left the north of Germany, to establish themselves in the fertile vallies of Italy, they carried in the front of their

armies a Bull in bronze. It was this same emblem, the idol god of almost all the nations of the world, that the Hebrews required Aaron to make in the wilderness, to march before them, and lead them on to victory. I mention these examples to show, that the first coins and medals had represented upon them the figure of the deity they worshipped, and this appears to have been the earliest worship among men we have on record. It was the idolatry of Baal Peor, so strictly forbidden in scripture—a worship which still remains to the present day in India, and other parts of the East, almost in its primitive form; and in almost all nations of the earth, even at the present day, its relicts still remain.

In England, this nation, blessed with the light of revealed truth, still exhibits in the May-pole, hung with its flowery garlands, and surrounded by the groups of dancing youth, a relict of this abominable worship. This great festival of Bacchus was held in May, the time at which the sun used to enter the sign Taurus, the then vernal equinox, in honour of the first gods of Scythia, the Bacchus of India and Asia—the Baal Peor of sacred writ—the Lingham of the East—and the Priapus of Imperial Rome. This representation, under the figure of the Bull, of that power which gives life to all things, and whose great festival was at the time of the vernal equinox, when all nature seemed awakening from the sleep of death to animation, and passion, and life. The Druidical worship of Europe was a part and portion of this same idolatry.

This emblem upon coins was gradually discontinued, as science and art made its progress among nations, and the coins and medals of Greece had the heads of other deities struck upon them, and but few, if any of their kings. Nor do I think there was struck in Rome any

coin with the head of a living personage upon it, until after the death of Julius Cæsar. But I fear I am continuing this letter too long; and yet I cannot help mentioning another specimen of money called *Tessera*, which had on it various devices, which money was often used as tickets of admission to the public games. It was also employed by the Greeks to communicate orders from the general in war, and was usually a square tablet, on which he wrote his orders; sometimes it had wings, in order to attach it to places. There was also used a smaller sort of square money with wings.

To attach wings to money, is emblematical of its instability; for it very often makes use of them, and flies away from its possessor.

I am, Sir, your obedient Servant,

BEN. COOK.

Birmingham, 15th August, 1828.

Recent Patents.

To WILLIAM CHURCH, *of Birmingham, in the County of Warwick, Esq. for his Invention of certain Improvements in apparatus for spinning fibrous substances.*—[Sealed 13th July, 1827.]

THESE improvements consist in a peculiar adaptation of a jacket or case to the spindle, ordinarily used in those spinning machines called billies, jennies, or mules, the object of which is to prevent the threads from breaking in the process of what is technically called lapping up or winding on.

The mode of constructing this jacket or case may be that described in Plate XIV, figs. 1 to 4, or it may be slightly varied from that form without affecting the principle.

Fig. 1, *a*, *a*, *a*, represents a spindle of the ordinary construction, on which is fixed a collar *b*, shewn also detached, and in section at fig. 2. One side of this collar is cut nearly through longitudinally, as will be perceived by reference to the last mentioned figure, and into this slit is introduced a slender spring catch *c*, seen likewise in fig. 1, which spring catch has a tendency to exert itself outwards.

Upon the fixed collar *b*, there is placed a sliding collar *d*, fitted so as to allow it to slip up and down freely. When this collar is slidden upwards, it presses against the inclined part of the spring catch *c*, forcing its upper or catch end deeper into the slit, and thereby conceals the catch in the fixed collar. Fig. 3, is a representation of the jacket or case intended to be mounted upon the spindle, and fig. 4, is the same shewn in section.

This jacket may be made of light wood, or of any other suitable material, and is to be fitted so as to turn very freely upon the spindle; its flanch end has a bush *e*, fitted into it, which rests on the upper end of the fixed collar *b*; when the jacket is placed upon the spindle, the catch of the spring *c*, acts in the conical groove at the bottom of the bush *e*, and thereby holds the jacket and the spindle tightly together.

The object of confining the jacket to the spindle is, that they may both revolve together during the operations of drawing and twisting; but when it is wished to lap up or wind the spun thread on to the shell or jacket, it is then necessary to loosen the jacket from the spindle in the following way.

By any convenient contrivance let the sliding collar *d*,

be raised, which presses the spring back into the slit of the fixed collar, as before described, and thereby relieves the jacket from the pressure of the spring catch, when the jacket is allowed to revolve upon the spindle very freely.

The patentee states in conclusion, that he has described one mode of constructing and applying his invention, which sufficiently illustrates its principles. The mechanical details by which it is to be adapted to a spinning machine are susceptible of numerous variations; he does not, therefore, limit his claim of invention to the mechanism as above described, but claims as part of, and belonging to, his invention of improvements in the apparatus for spinning fibrous substances, "any application whatever of a shell or case to a spindle, for the purpose of preventing thread from breaking in the process of lapping up or winding on, whether applied to mule, billy, jenny, or any other spinning machine, by whatever name known in or by which the operations of drawing and lapping up are successively, and not simultaneously, performed."—[*Inrolled January*, 1828.]

To Charles Pearson, *the younger, of Greenwich, in the County of Kent, Esq.*, Richard Witty, *of Hanley, in the County of Stafford, Engineer, and* William Gillman, *of Whitechapel, in the County of Middlesex, Engineer, for their having invented a new or improved method or methods of applying heat to certain useful purposes.*—[Sealed 13th December, 1826.]

The specification of this patent has no drawing attached to it, as no specific form or arrangement of parts are

claimed; but the invention, in its broadest latitude, applies to the heating of every kind of boiler.

The peculiar feature of novelty proposed is the construction of a descending flue under a boiler, the bottom of the boiler being bevelled or formed as an inclined plane. The object of this contrivance is, that the greatest intensity of heat from the furnace, (which will be at the commencement of the flue at the top of the inclined plane) shall act against the shallowest part of the water in the boiler, and thereby generate steam with great rapidity from the surface of the water; whereas, in ordinary boilers, the heat has to pass through the whole mass of the water.

A mode of applying this principle is proposed in the construction of a tube boiler. The tubes are to be placed horizontally, and ranged side by side, gradually rising one above the other upon a suitable inclination. They are to be combined by means of lateral boxes or tubes, leading from one to the other at the ends, by which arrangement the water will be enabled to flow through the whole range.

A force pump is, applied for the purpose of injecting water into the boiler at the lower tube, from whence it gradually rises through the range as it acquires heat, and passes off at the top in the form of steam.

Another proposition is to form the boiler with ledges, one rising above the other; but the precise method of doing this we do not exactly understand. It is sufficient to say, that in whatever way the boiler is constructed, the descending flue is the novel feature of the invention, which it is considered will cause the whole of the heat to be taken up by the water; or at least the greater part of it, and to generate steam in the boiler with greater

rapidity and economy than upon any other plan.—[*Inrol. June,* 1827.]

To James Frazer, *of Houndsditch, in the City of London, Engineer, for his Invention of an Improved method of constructing Capstans, and Windlasses.*—[Sealed 11th January, 1827.]

This purports to be an improvement upon a patent dated February 25th, 1826, for a method of constructing capstans and windlasses, (see our first series, Vol. XIV, page 243.

The present improvement consists in forming two rows of capstan bar holes, for the insertion of capstan bars; one row of the holes being in the neck of the capstan, the other in the drum head. The holes are to be slightly inclined from the horizontal, the upper row tending downwards, the lower row upwards, so that the outer ends of the capstan bars, inserted in either of the rows of holes, shall range in the same line for the convenience of being more readily worked by the men.

Within the upper part of the capstan, toothed gear is to be introduced, for the purpose of enabling the capstan to be worked with increased power. The diameters of the wheels and pinions, and the number of teeth in each, may, of course, be varied at pleasure, as set forth in the former specification above alluded to.

This contrivance is to prevent the necessity of pins or clutches, to fix or disengage the geer; for when the capstan is to be worked by the ordinary power exerted by the men, the bars are to be inserted into the row of holes in the neck of the capstan; but where an additional power

is required, then the bars are placed in the holes of the drum-head, and being worked, the barrel of the capstan will be driven round by the toothed geer.

The same contrivance is also applicable to a windlass, and may, it is said, be adapted in a very simple way, but the patentee has not shewn drawings of the mode.—[*Inrolled July*, 1827.]

To James Frazer, *of Houndsditch, in the City of London, Engineer, for his Improved method of constructing Boilers for Steam Engines.*—Sealed 11th January, 1827.]

It is proposed as the subject of this patent, to surround the boiler of a steam-engine with a jacket or outer case, leaving a space of about three inches between that and the boiler, which space is to be occupied with water, up to the level of the water within the boiler.

The intention of this outer vessel of water, is to prevent the bottom of the boiler coming in contact with the wood-work on ship board, and consequently rendering it much more safe for steam vessels, than the usual construction of boilers are.

In order to assist in heating the water in the outer vessel, the flue from the furnace within the boiler, is to be compressed into a tube, and carried down, and passed through between the boiler and its jacket, which tube being encompassed by the water, will, by that means, communicate a great additional heat to the boiler, or, in other words, take up that heat which would otherwise pass off without advantage. The generating of steam being, by these means, promoted, and the fuel consequently economised.—[*Inrolled July*, 1827.]

To WILLIAM GOSSAGE, *of Leamington Priors, in the County of Warwick, Chemist, for his having invented or found out certain Improvements in the construction of Cocks for the passage of Fluids.*—[Sealed 2nd January, 1828.]

THE patentee commences his specification by commenting upon the ordinary construction of liquor-cocks, in which he says, as generally made, the stoppage is attempted to be produced by closely fitting together two surfaces of *metal*; but in the improved cock about to be described, an elastic substance is placed between the parts where the stoppage is effected, by which means, perfect tightness is produced, and friction diminished.

The methods of securing this elastic substance, and of so placing it, as to be certain of its producing the required effect, forms the principal feature of the invention. Plate XIV, fig. 5, exhibits that formed cock which is proposed to be employed for drawing off fluids from a vessel. Fig, 6, is a section of the same; *a*, is the tail or barrel of the cock, intended to fit into the vessel in the usual way. This part conducts the fluid to the body of the cock *c*.—*b*, is the nozzle or discharge pipe. This nozzle part is made to screw up into the body *c*, till it is nearly in contact with a shoulder shewn in the lower part of the chamber. Between the nozzle and this shoulder, an elastic washer or collar of leather, or other suitable material, shewn in the figure at *z*, *z*, is placed, and the nozzle being screwed up quite tight, presses this washer or elastic collar against the shoulder, so as to prevent the passage of fluids between them. The washer has a hole cut through it of sufficient size to allow the liquid to pass when the cock is open; *d*, is a plug or stopper, which is raised and depressed by the action of a screw, or other suitable means.

As the patentee does not claim any exclusive right with respect to the means of giving motion to this stopper, it is only necessary to describe the method employed and shewn in the figure, where the action of the stopper is effected by a male screw cut on its upper part, working in a female screw in the cap of the cock.

When the stopper is turned in one direction by its thumb-piece, the lower end of it is pressed so closely against the elastic collar as to effect a perfect stoppage of the passage through the nozzle. The stopper being turned in a reverse direction it is raised from the collar, and a free passage allowed for the fluid through the nozzle. In the section, fig. 7, the cock is represented with the passage closed, (which is the section of a cock, slightly varied in form, from the preceding.) In fig. 8, the plug is raised, and the aperture open.

In addition to the action of the screw, it is proposed occasionally to employ, (more particularly for lock cocks,) a coiled spring, to assist in forcing down the stopper against the elastic collar. This may be applied to the stopper in various ways, but the method preferred is shown in fig. 9, which is a horizontal or plane view of the upper part of the cock. *d*, is the stopper; *b*, the spring, fastened at the end to the cap *c*, and at the other to the stopper *a*. At the time of fixing these two ends, the spring should be turned, so as to produce a sufficient power of re-action to occasion the requisite degree of pressure by the stopper on the elastic washer.

It will be perceived that the thumb-piece being turned so as to open the passage, the spring will be occasioned to coil round the stopper, and have a tendency of re-action to bring it back to its bearing on the washer, thus preventing the cock from being left open through negligence.

Fig. 10, shows the shape of the elastic collar, with the hole through it. The liquid is prevented from rising

through the upper part of the cock, by elastic collars placed in a stuffing-box *g*, formed in this part, and kept in close contact, surrounding the stopper, by being screwed down with the cap *h*, as shewn in fig. 6.

Fig. 7, exhibits another method of forming the nozzle into a bearing for the elastic collar *z*, *z*. In this figure, the part forming the nozzle is distinct or separate from the screwed part, which forces the nozzle against the shoulder in the body of the cock; *i*, being the screwed part, and *b*, the nozzle, these are distinguished in the figure by the hatched lines passing in different directions. In this figure the upper part of the cock is bored true and cylindrical, and the fluid is prevented rising past the stopper by elastic collars fixed round the stopper, after the manner of a piston, and fitting in the cylindrical part.

Fig. 8, shews a method of securing the elastic washer, by a swivel screwing on the outside of the cock, and forcing up the nozzle when screwed tight; *b*, the nozzle, *i*, the swivel.

Fig. 11, exhibits another method, wherein the elastic collar is secured by placing it between two flanches, one formed on the upper face of the nozzle, and the other on the lower part of the chamber of the cock. The flanches are forced together by screws, as shewn in the figure, or by screwed pins and nuts.

Fig. 12, represents the cock, having its plug placed horizontally, and constructed so as not to allow the fluid to enter the body *c*, except when the passage is opened by withdrawing the stopper *d*, from the elastic collar; *a*, is the tail intended to be fitted into a vessel of fluid.

In all these figures the elastic washer is shewn and marked *z*, *z*, and the same letters of reference as regards the stuffing-box, stopper, or plug, are employed in all the figures.

All the bearings for the elastic collar or washer exhibited in the above figures, are shewn as being plane or flat, but the patentee does not confine himself to this shape, as the parts against which the stopper is forced may be made either flat, cup-formed, conical, or of other shapes, taking care to have the end of the stopper of a corresponding figure.

Fig. 13, exhibits another method of applying an elastic substance between two metallic surfaces producing a tight stoppage.

In this fig. the chamber of the cock is made of a truly conical shape, and lined with leather, or some other elastic material, shewn by the letters *z*, *z*, which is cut to the required shape and size ; the two edges being placed together, the hollow cone thus formed is introduced into the chamber. The upper and lower edges of the elastic lining being made to project beyond the chamber, they are turned over, and by means of the screwed caps *b*, and *c*, are secured against the upper and lower edges of the chamber. This prevents the lining from moving when the plug is turned.

The plug *d*, is made of a conical shape to correspond with the chamber, and is kept down to its bearing by the action of a spiral spring inclosed in the upper cap *c*, of the cock. Two passages to correspond with that of the plug are cut through the elastic lining, and the edges of the passage through the plug are bevelled, or countersunk, to prevent their action against the edges of the lining.

When the plug is turned so as to bring the passage through it opposite to that through the chamber, as at fig. 14, the cock is open, but when opposite to the solid part of the chamber, as fig. 13, the cock is closed.

The elastic lining might also be secured by a piece screwing into the chamber, and having a projecting edge

or shoulder to press the lining against the edge of the chamber, instead of using the cap screwing on the chamber. The method of applying the spiral spring to act on the plug may be varied. The fluid may be occasioned either to pass directly through the plug, as shewn in the fig., or it may be allowed to discharge itself through the lower end of the plug, a discharging nozzle being then attached to the screwed cap *b*.

The form and size of these cocks may be varied to suit all the different purposes for which they may be required, and the customary means of security may be applied to them to produce lock-cocks.

Lastly.—I wish it to be understood that I do not claim as my invention the adapting of elastic substances to the plugs or stoppers of cocks, *but the peculiar methods of applying and securing these substances, as exhibited in the drawings, and described in the specification*, and which I believe to be original. I further claim the application of a coiled spring to the rising plug, as shewn in fig. 9; but do not make any claim for the application of a spiral spring to the conical plug, in fig. 13.

To JOSHUA TAYLOR BEALE, *of Church Lane, Whitechapel, in the County of Middlesex, Engineer, and* GEORGE RICHARDSON PORTER, *of Old Broad Street, in the City of London, Merchant, for their new invented mode of communicating heat for various purposes.* [Sealed 19th January, 1828.]

THE subject of this patent is a novel means of producing a hot medium surrounding a pan or boiler for boiling and evaporating sugar or other materials, or for dyeing,

or any other process, in a vessel requiring a high but uniform temperature; and which proposed improvement will also apply to the generating of steam and various other purposes, where a heating medium of considerably high temperature is required, without the pan or boiler being brought into immediate contact with the fire.

Plate XIV, fig 15, shews the form and arrangement of the apparatus in section; *a*, is the furnace set in brick-work as usual; *b*, is an iron vessel fixed in the brick-work; and *c*, is a boiler or pan of copper or other metal placed within the former, and secured thereto by flanges and bolts, forming a steam tight-joint.

A quantity of spirits of turpentine is placed in the lower part of the vessel *b*, and the fire being raised in the furnace beneath it, the turpentine will be made to boil, and to throw off its steam or vapour at a temperature of 316 degrees; which vapour, by surrounding the boiler or pan *c*, will communicate a heat to the materials in the pan, much greater than the steam from boiling water could do under the ordinary pressure of the atmosphere.

From the vessel *b*, a pipe *d*, leads upwards to a refrigerator *e*. Through this pipe the vapour or steam of the boiling turpentine passes to the refrigerator. In the refrigerator a vessel of cold water *f*, is placed, and on the side of the refrigerator a small pipe *g*, opens to the atmosphere. The steam or vapour from the turpentine, as it rises up the pipe *d*, comes in contact with the bottom of the cold water vessel, and the vent tube *g*, being open to the atmosphere, the vapour immediately becomes condensed into its former liquid state, and runs down the pipe *d*, into the vessel *b*, to be subjected to the boiling as before described. There is a pipe and cock *h*, leading from the bottom of the vessel *b*, for drawing off the spirits of turpentine when required.

The shapes of the several vessels may be varied at pleasure, or to suit convenience, and the contrivance may be constructed upon any scale.

Though spirits of turpentine is proposed to be employed, it is to be understood that the patentees do not confine themselves to that particular material, as any liquid which boils at a higher temperature than water will answer the purpose, provided the vapour possesses a greater specific gravity than atmospheric air.—[*Inrolled July*, 1828.]

To JOSEPH CLISILD DANIELL, *of Stoke, in the County of Wilts, Clothier, for his Invention of certain Improvements in Dressing Cloths, and in Machinery applicable for that purpose.*—[Sealed 2nd January, 1828.]

THE subject of this patent is an apparatus to be employed in the dressing of woollen cloth by hand, that is, by means of hand cards, instead of a gig-mill, or a brushing machine, which is commonly employed for dressing cloths after the pile has been cropped or shorn, in order to smooth the face, and give lustre to the finish.

Plate XV, fig. 3, is a side view of the apparatus or machine, which consists of two end standard frames *a*, *a*, supporting two slabs of stone *b*, *b*, which are intended as non-elastic tablets or surfaces, upon which the cloth is to bear while it is under the operation of brushing or dressing by the cards or brushers, which are applied to the surface of the cloth by hand.

The cloth intended to be operated upon is wound upon a roll at *c*, from whence it is passed upwards over the face of the tablet *b*, contiguous to it, and over rollers placed in the upper part of the standard frame, then downwards

over the face of the other slab *b*, to the receiving roller *d*.

To the ends of the rollers, *c* and *d*, ratchet wheels are attached, having palls dropping into their teeth, for the purpose of holding the cloth tightly distended.

The two portions of the piece of cloth stretched over the faces of the tablets *b*, *b*, are now in situations convenient for dressing, which is done by means of hand cards of the form represented at fig. 4, or by any other convenient implement of that kind.

When the surfaces of those portions of the cloth under operation have been sufficiently dressed, the palls are raised from the ratchets, and the roll *c*, is turned for the purpose of drawing the cloth forward, and placing other portions of it upon the faces of the tablets to be operated upon.

The process thus far described applies to dressing the cloth in a dry state, but when it may be required to dress the cloth wet, then a trough *e*, containing water, is placed under the machine, and the cloth is carried down from the roller *c*, under a guide roller *f*, in the trough, as shewn by dots.

The rollers, *c* and *d*, are described as turned by winches, in drawing the cloth forward or backward, but in some cases it may require a greater power to draw the wet cloth over the surfaces of the slabs than can conveniently be exerted by hand. In that event, the patentee attaches a large toothed wheel to each of the rollers, and works them by a pinion upon a rotatory shaft, driven by a band and rigger from a steam engine or otherwise, which pinion is readily thrown in and out of gear by a hand lever.

The patentee is aware that machines, or apparatus for dressing cloth, resembling in some measure that above

described, have been employed before for that purpose, he therefore wishes it to be understood, that the principal feature of his present invention, and that which he now claims under this patent, is the tablets or slabs *b*, *b*, of stone, or other hard substance, which by forming a firm and non-elastic bed for the cloth to bear against, enable the points of the cards to penetrate more effectually into the wool, and thereby to draw out and lay the pile more perfectly than has been done by any other means. —[*Inrolled July*, 1828.]

To THOMAS STANHOPE HOLLAND, *of the City of London, Esq. for his Invention of certain Combinations of Machinery for generating and communicating power and motion applicable to propelling of fixed Machinery, as also Floating Bodies, Carriages, and other locomotive machines.*—[Sealed 19th December, 1827.]

THE patentee says his invention consists in "an engine which derives its power from the setting in motion of a lever movement, similar to that which is used in the instrument commonly called the lazy tongs, and which lever movement I call for distinction a zig-zag."

The figure accompanying the specification is rather a diagram, exhibiting the mathematical arrangement and principles upon which the mechanism is intended to be constructed, than an operative machine.

Plate XV, fig. 5, represents a side elevation of such an arrangement of machinery as is intended to be applied for the purpose of propelling a carriage; *a*, *a*, *a*, are a series of cross levers, connected together by joints in

their centres, and at their extremities. These levers open and shut, that is, elongate and contract, upon the principle of the lazy tongs, which is a contrivance well understood by mechanics.

The lazy tongs is attached in the middle to the axle or shaft of a pair of running wheels *b*, of large diameter, upon which axle they are made to elongate and contract by means of a lever *c*, intended to be worked by manual labour, or by steam or any other power.

At each extremity of the lazy tongs, a small running wheel, *d* and *e*, is attached, by an axle connected to bent arms extending from the outer pairs of levers. The action of the lazy tongs, therefore, in elongating, impels these smaller wheels outward from the central shaft or axle, and their contraction brings the lesser wheels inwards again toward the centre. To two of the joints of the cross levers or lazy tongs, the upper jointed levers *f*, *f*, are attached, and in a similar way the lower levers *g*, *g*, are also connected, which last carry a heavy roller *h*, intended as a balance weight, to assist in working the apparatus.

A power being applied to the longer arm of the actuating lever *c*, in depressing that end the shorter arm will necessarily rise, and by means of the cord *i*, draw up the weight *h*, and the fulcrum of the lever *c*, bearing upon the upper joint of the levers *f*, *f*, will depress and straighten those levers, as shewn in the figure, and at the same time throw the cross levers *a*, *a*, into obtuse angles, elongating the lazy tongs, which slides upon the perch bar *k*, and hence projecting the small wheels, *d* and *e*, outwards.

The general action of the apparatus being now explained, it is next to be observed that each of the small

wheels, *d* and *e*, have ratchet wheels affixed to their naves, with palls locking into their teeth, which allow the wheels *d*, and *e*, to revolve in one way only.

Now let it be supposed that the wheels *d*, and *e*, have been projected to their greatest distance outwards by the depression of the actuating lever *c*, as above described, the raising of that lever will cause the cross levers of the lazy tongs to be brought together again, and the small wheels to approach the centre. But the pall in the ratchet, upon the nave of the wheel *d*, (which we will call the fore wheel,) preventing that wheel from retrograding the wheel *d*, becomes stationary, and is now the fulcrum point to which the machinery must necessarily be brought up, when the lazy tongs are collapsed.

The centre and hind wheels being thus brought up to the fore wheel by the contraction of the lazy tongs, the depression of the actuating lever *c*, as before, will now expand the lazy tongs again. But the pull of the ratchet on the nave of the small wheel *e*, (which we will call the hind wheel,) preventing that wheel from running back, the wheel *e*, now becomes stationary, and the fulcrum point from whence the other parts of the machinery must be projected.

Thus by the successive expansions and contractions of the lazy tongs, and changing the fixed or fulcrum point from the fore to the hind wheel, and *vice versa*, the carriage, as a locomotive engine, is progressively impelled forward, much in the same way as a caterpillar moves upon the ground; the velocity of the movement of course depending upon the power and speed with which the actuating lever is worked.

There is a platform *l*, *l*, placed upon or above the main axle, for the purpose of carrying goods of any kind which

it may be required to transport by means of this carriage. The small wheels are enabled to turn with their axles horizontally, for the purpose of steering; which may be done by a guide turning the handles *m*. There is also a fly-wheel *n*, mounted in the standard *o*, the axle of which is formed as a crank, and connected to the top joints of the levers *f*, *f*, by which means the movements of the machinery are regulated.

The same principles as those above described, in connection with a locomotive engine, are also proposed to be applied with certain modifications as a moving power to fixed machinery. It will not, however, be necessary to particularise the arrangement of machinery suited to that purpose, as the principles are fully set forth above.

The patentee concludes by saying,—" Now, whereas it is evident that the mode of applying my said invention must depend upon the particular nature of the work that it is required to perform, and the relative proportions also of its various parts may be varied to meet similar necessities. But I claim as my invention, the combinations of machinery, which constitute the machine or engine represented by the drawings annexed, and hereinbefore particularly described, and such variations on the same as are hereinbefore mentioned, and are necessary to make it applicable to the moving of fixed machinery, as well as locomotive engines; and such my invention being, to the best of my knowledge and belief, entirely new," &c. &c. — [*Inrolled June*, 1828.]

To Francis Halliday, *of Ham, in the County of Surrey, Esq. for his Invention of certain Improvements on Apparatus used in drawing Boots on and off.*—[Sealed 4th October, 1826.]

The apparatus in question are a boot jack, and boot hook, the former of which is made to fold up like a two foot rule, and the latter to pack together in a small compass.

Plate XIV, fig. 16, exhibits the boot jack open ready for use; *a*, *a*, are metal bars forming the sides, and opening upon a rule joint *b*, at the back part, also having joints at *c*, *c*, by which the bars fold back, and bring the whole into a pocket size. There are two rods *d*, which are jointed together, and let into grooves formed in the inner parts of the side bars, in which when the bars are closed these rods lie concealed.

The other contrivance is a boot-hook; fig. 17, which has a slot *a*, cut through it at the upper part of the shaft, for the purpose of admitting a pin to pass through, which holds the socket of the handle *b*.

By this contrivance the handle can be turned down against the sides of the shaft, and be slidden back so as to lie within the hook. At the outer extremities of the handle a screw driver and button hook may be formed, or a punch or any other small instrument of that kind, which it might be found convenient to have.

Two of these boot-hooks may be placed close together, and a small pin *c*, at the back of the handle, being passed into a corresponding hole in the shaft of the other hook, they will by that means be held together; and the whole apparatus, with the boot-jack, will go into a small case, which may be carried in the pocket.—[*Inrolled April* 1827.]

To WILLIAM KINGSTON, *Master Mill Wright, of our Dock Yard, Portsmouth, and* GEORGE STEBBING, *Mathematical Instrument Maker, High Street, Portsmouth, for their Invention of certain Improvements on Instruments or Apparatus for the more readily or certainly ascertaining the trim and stability of Ships, and other Vessels.*—[Sealed 20th December, 1826.]

THIS is a small instrument to be attached to the under part of the deck of a ship, or in any other convenient place, where by its swinging as a pendulum, the pitching and rolling of the vessel may be observed.

Plate XIV, fig. 18, represents the external appearance of the instrument; *a*, is the under part of the deck or a beam into which the forked staple *b, b*, is to be screwed securely, and there to remain fast; *c, c*, is the box containing the mechanism about to be described.

This box is intended to swing upon pivots *d, d*, which are made fast to its sides, and pass through cylindrical holes in the lower ends of the forked staple, the pivots having indexes *e, e*, fixed to their extremities. On the sides of the forked staple there are segment plates *f, f*, fixed, with graduations on their faces, as shewn detached in the auxiliary figures, 19.

The forked staple *b, b*, being fixed firmly to the ship, the box *c*, necessarily swings fore and aft upon its pivots, and always hangs perpendicularly by its gravity, however much the ship may pitch. The box may therefore be considered to be always at rest, and its indexes *e, e*, also, and the forked staple, with its graduated segments, to swing as the head of the vessel rises and falls in the water. Consequently the angle of deviation from the horizontal, formed by the pitching of the vessel, will be indicated in

degrees by the traversing of the graduated segment-plates *f*, *f*, at the back of the stationary indexes *e*, *e*.

The rolling of the vessel, that is, its lateral deviation from the perpendicular, will be seen by the graduated dial plate *g*, in front of the box *c*. From the upper part of the box in the interior, a pendulum is suspended, which oscillates laterally. The lower part of this pendulum has a segment-rack, taking into the teeth of a pinion upon the axle of the index *h*. Hence as the vessel rolls, inclining from its upright position toward either side, the pendulum within constantly falls into the perpendicular, and thereby causes its rack to move the pinion, and the index to show the trim of the vessel, or the angle of deviation from the perpendicular.

At the lower part of the pendulum, within the box, there is a projecting piece, which is intended to act as a paddle in a vessel of mercury, for the purpose of forming a small resistance to the vibration, which tends to steady the action of the pendulum, without introducing friction.—[*Inrolled June*, 1827.]

To William Jefferies, *of London Street, Radcliffe, in the County of Middlesex, Brass Manufacturer, for his Invention of certain Improvements in calcining or roasting, and smelting, or extracting Metals, and Semi-Metals from various kinds of Ores, and Matters containing Metals or Semi-Metals.*—Sealed 20th February, 1827.

This improved process has for its object the economization of fuel and of labour in the operations of smelting ores. The mode proposed is first to pulverize the ore, of

whatever kind it may be, by means of a rolling mill or beater, and when it is reduced to such a degree of fineness as will enable it to pass through a sieve, then mix with it a quantity of small coals, and turn them together into a coking oven.

In this situation, the door of the oven being open, the ore undergoes the operation of roasting while the coal is burning into coke; and when that is done, the oven door must be closed, for the purpose of excluding the atmospheric air while the coking is going on, as the coke would become consumed if the air was admitted.

When the coking is complete, the materials are withdrawn from the oven, and allowed to cool, after which they are broken up into small pieces, and introduced into the smelting furnace, when the operation of smelting goes on in the usual way, the ore and the fuel being in contact with each other.

The proportional quantities of ore and of coal to be mixed together, will depend upon the kind of ore intended to be operated upon, and its condition, and also the quality of the coal, which being uncertain, no specific proportions can be named. It may however be stated generally, that coal which is most free from sulphur is to be preferred; and the necessary quantities of each will be known upon observing the process by any experienced workman. If it is found that there is not sufficient quantity of coke in combination with the ore, when in the smelting furnace, a further supply of pure coke may then be added.

By this mode of conducting the process of smelting ores, the ordinary operation of roasting is dispensed with, as that is done in the coking: consequently the extra fire which would be employed for that purpose is dispensed

with also, and the ore being so intimately mixed with the coke, the smelting may go on with little or no attention. —[*Inrolled August*, 1827.]

To AGUSTUS COUNT DE LA GARDE, *of St. James's Square, Pall Mall, in the County of Middlesex, in consequence of a communication made to him by a certain Foreigner residing abroad, for a method of making Paper of various descriptions, from the Bullen or Ligneous parts produced from certain Texile Plants; in the process of preparing the same Texile Plants, by the Rural Mechanical Break, (for the exclusive use of which he has already applied for a Patent,) and which Substances are to be employed alone, or mixed with other suitable materials in the manufacture of Paper.*—[Sealed 20th February, 1827.]

THIS invention consists in manufacturing paper from the boon or woody particles which are broken off from the outside of the stalks of flax, hemp, hops, and various other fibrous or textile plants, when broken and prepared without being previously soaked, or what is called, dew retted.

The apparatus by which such materials are broken and prepared, is called by the patentee, the "Rural Mechanical Break," and is described in the specifications of his patent above alluded to, (see the XIVth Vol. of our First Series, page 191, and plate X.)

The boon, (or as the patentee calls it, the *bullen*,) when thus broken off from the fibres of the plant, is to be soaked in water for about twenty-four hours, occasionally changing the water to get rid of the colouring matter; and

when the boon has by this soaking become soft and pliable, the water is to be drawn off, and the material beaten in a stone mortar, with a wooden pestle, until its fibres are perfectly separated one from the other.

The material is now to be put together into a heap, for the purpose of acquiring heat, in order that it may get into a state of fermentation; and this may be promoted by occasionally sprinkling it with hot water in which a small quantity of bran has been boiled. The hot water must not exceed a temperature of 100 degrees, and this may be carried on until the fermentation has brought the vegetable matter to that state at which putrefaction is beginning to take place.

The heap must now be uncovered, and cold water thrown upon it, to stop the further progress of fermentation. After this the material is to be thoroughly washed, strained, and squeezed, to extract as much of the water and colouring matter as possible.

The next process is that of bleaching, which is done by immersion in a solution of muriate of lime in a close vessel. The material is to be agitated frequently during the operation, and after the bleaching is complete, and all the lime or other matter washed away, the fibres are to be macerated in the ordinary machine employed for making paper, and then put into the paper-making vat, in order to be made into paper by the ordinary means.

It is stated that this material will make as good paper as is generally made from rags, but that it will have a small degree of transparency. This, however, is proposed to be obviated by mixing a few fine linen rags with the material, or by introducing into the pulp a small quantity of chalk, finely prepared, which will effect perfect opacity. —[*Inrolled August,* 1827.]

To NATHAN LUCAS, *and* HENRY EWBANK, *both of Mincing Lane, in the City of London, Merchants, for their having Invented an Improved Process to be used in the dressing of Paddy or Rough Rice.*—[Sealed 10th March 1827.]

A patent was granted, in February 1819, to the latter of the above-named patentees, for "machinery for cleaning and dressing paddy or rough rice, so as to fit it for culinary purposes;" upon this former patent the present is to be considered as an improvement.

In the process described in the above specification, the rice was prepared by beating and rubbing it in a mortar, which broke off the outer coat or husk; after this it was passed through sieves of different degrees of fineness, for the purpose of removing the second or inner skin, which by rubbing fell off as bran. When thus dressed, that is cleansed, the rice was ready for polishing, which is the ordinary process whereby it is brought to its clean white state as exhibited for sale in the shops.

It appears by the statement of the patentees, that this process perfectly answers its intended purpose in America, but that by means of the voyage by sea, or the humidity of the atmosphere in this country, the rice, previous to its being operated upon here, has imbibed a certain degree of moisture, which causes it when in the mortar to become glutinous, and its inner coat to adhere firmly to it.

It is therefore now proposed to employ two mortars; and after the rice has been titillated for some time in the first mortar, it is then withdrawn, and, if we understand it right, is passed through a sort of bolting machine, in which it is subjected to a strong current of air, for the purpose of drying and hardening it, and then introduced

into the second mortar, to have the skin further broken off, previously to its being polished.

If it should be found necessary, the shifting of the rice may be repeated several times; and it is this shifting and blowing upon it, for the purpose of hardening the rice, which constitutes the subject of this improved process and patent right.

There are no drawings accompanying this specification, therefore we are unable to exhibit any particular kind of apparatus suited to the performance of the process.—[*Inrolled May*, 1827.]

To JAMES WOODMAN, *of Piccadilly, in the County of Middlesex, Perfumer, for his having invented Improvements on Shaving and other Brushes, which Improvements are also applicable to other purposes.*—[Sealed 22nd March, 1827.]

THIS improvement, as it applies to shaving brushes, consists in forming a tube or recess in the handle of the brush, which is to contain soap or shaving paste, and whenever a supply is wanted, a small pin or sort of piston is pressed down into the recess, which forces a quantity of the soap or paste through the back of the brush in among the hairs.

The soap is by that means introduced into the brush, and is brought into use by dipping the hairs into water, and then rubbing them upon the face.

The form of the brush is of no consequence, nor the quality of the hair, whether it be made of bristles, badger's hair, or camel's hair; the invention being the recess for holding the soap in the handle, and the hole through

which it is passed into the hairs by a sliding pin or piston, as described.

The same construction of brush is applicable to holding oil or any other material, and even to painting brushes; but in that case the hole through which the oil or paint passes must be covered by a valve, otherwise the liquid material would flow out too rapidly.

Scrubbing brushes, extract brushes, nail brushes, and a variety of other kinds of brushes, may have soap introduced into the back or case in which the hairs are fixed, and it may be forced through small holes into the hairs, as occasion may require.—[*Inrolled September*, 1827.]

To JOHN MC CURDY, *of Cecil Street, Strand, in the County of Middlesex, Esq., in consequence of a communication made to him by a certain Foreigner residing abroad, and discoveries made by himself, for an Invention of certain Improvements in the process of Rectification of Spirits.*—[Sealed 28th April, 1827.]

THE material proposed to be employed in this improved method of rectifying of spirits is charcoal, which is to be re-chared immediately before using, and ground or bruised to a fine powder. This pulverized charcoal is to be introduced into the still in the proportion of about one gallon of the charcoal to four gallons of spirits.

The application of fresh chared wood, or charcoal, to the spirits in this way, will, it is said, totally destroy the empyreumatic flavour, which the spirit may have contracted in the process of distillation.

It is further proposed, in order to get rid of the essential oil in spirits, to mix water with it, and then to introduce the fresh chared charcoal, in the way described, which will perfectly purify it, and leave the spirit without any unpleasant flavour.

Spirits rectified in this way will be found particularly desirable for preparing aud mixing with cordials.—[*Inrolled October*, 1827.]

To William Cleland, *of the City of Glasgow, Gentleman, for his Invention of certain Improvements in the process of Preparing, Refining, and Evaporating Sugar.*—[Sealed 4th July, 1827.]

This is a method of promoting evaporation by the immersion of a rotatory worm, heated by steam, into the boiler, in which a solution of sugar or any other crystallizable material is undergoing the process of concentration.

Plate XV, fig. 6,* represents the apparatus partly in section; *a*, is a steam boiler, supposed to be constructed over a furnace in the usual way; *c*, is a pipe through which the steam passes to heat the worm; *b*, is the worm formed by the numerous coils of a long pipe; *d*, is the vessel containing the crystallizable liquor under evaporation.

The extremities of the worm pipe are carried out straight, in the direction of an axle, and bearing upon the two end supports is enabled to revolve. The steam generated in the boiler *a*, acting against the bottom of the vessel *d*, heats the material contained therein, and by causing its aqueous parts to evaporate, promotes the required concentration and crystallization of the sugar.

* Called Johnson's in the plate by mistake.

The steam which passes from the lower boiler *a*, through the pipe *b*, is admitted into the worm pipe *c*, through small holes in its axis, and from thence blowing through the pipe, passes round all the coils, and discharges itself at the opposite end into the atmosphere; or is carried away by a pipe to be condensed, or into a chimney, or in any way that may be found convenient.

The worm is made to revolve by a winch applied to the end of its axle, or by a rigger actuated by a band from a steam engine, and, as it goes round, communicates to the fluid in which it is immersed such an additional quantity of heat, as greatly promotes the evaporation; at the same time, the agitation of the liquor, caused by the rotation of the worm, assists, in a considerable degree, the crystallization.

This apparatus is also applicable to the concentration of salt, and other matters, where evaporation of the aqueous parts is required to be performed with considerable rapidity, without exposure to the immediate action of the fire.[—*Inrolled January*, 1828.]

Review of Books.

A Popular Sketch of Electro-Magnetism, or Electro-Dynamics, with Plates of the most approved Apparatus for Illustrating the principal Phænomena of the Science, and Outlines of the parent Sciences of Electricity and Magnetism. By Francis Watkins, 8vo. London, 1828.

The subjects embraced in this little volume are of the most important character as respects electro-magne-

tism, and the unassuming and familiar style adopted by Mr. Watkins, is well calculated to illustrate a subject of which no popular view had previously been furnished. Electro-magnetism is indeed a new science, and the erudite volume published by Professor Barlow would be but of little use to the tyro in experimental philosophy. It may be proper to add, that our author has either invented or modified much of the apparatus described in this treatise, an advantage of which can only be justly appreciated by those who have witnessed the mathematical precision, and excellent mechanical arrangements of the instruments furnished from his establishment.

As a specimen of Mr. Watkins' style of illustration, we will take his account of Professor Barlow's magnetic compensation:

"An easy and simple mode of exhibiting the effects of the local attraction of the ship's iron may be afforded by delicately suspending a magnetic needle upon its centre of gravity, and when reposing in its natural position, placing below one of its poles any mass of iron which may be supposed to represent the iron in the fore part of the vessel; a deflection will then take place at that extremity. Mr. Barlow discovered that an equal effect is produced by a small mass of iron when placed near to a needle, as when a large mass is placed at a distance. To counteract the deflection, if another mass of iron be made to approach the opposite end of the needle, and be arranged above it, the needle will be restored to its original and natural position. It is not necessary that the masses of iron should be equal to each other in bulk (for the reason above stated,) as any difference therein may be compensated by bringing the smaller mass closer to the needle, *i. e.* within certain limits; for when iron is brought *very* near to the magnetic needle, it attracts, whether it

be applied above or below, or to the north or south pole; but when at a little distance, the law obtains as described by Mr. Barlow. It must here be observed, that the counteracting mass of iron in a vessel cannot be applied in this manner behind the magnetic needle; as it would in that case be necessary to regulate it for every change of position of the vessel, or of the iron in the fore part. Mr. Barlow therefore recommends, that previous to the vessel's proceeding on her voyage, the amount of deflection caused by the iron should be accurately ascertained. The correcting mass, instead, as in our proposed experiment, of being placed behind and above the needle, should be arranged and adjusted below and before the needle, in a position so as to double the tangent of the angle of deviation. The correcting plates (which are double, and of a circular form, composed of iron about one foot diameter) need not be permanently fixed; for if their exact situation be marked out, they may be removed: and whenever it is desired to estimate the local attraction of the iron in the vessel, they may be replaced, and the number of degrees noticed which they draw the needle from its position; the sum or difference of the angle, as compared with the recorded angle, will be the deflection sought. This operation is to be repeated whenever it may be deemed essential to correct the ship's course in relation to the true magnetic bearing."

The plates with which Mr. Watkins's book is illustrated, are essential to a right understanding of some of the most important portions of his volume, we purpose, therefore, returning to the subject, and copying one or two of the figures on a future occasion.

An Essay on Wheeled Carriages containing a concise view of their origin, and a description of the variety now

in use with comparative observations on the safety of those upon two and four wheels, and remarks on the dangerous construction of the present Stage Coaches, (by T. Fuller, Coach Builder, Bath,) Longman and Co. and Rodwell and Martin, London. 8vo. 80 *pages, with plates,* 7*s.* 6*d.*

This is an amusing little volume, commencing with the war chariots of Pharaoh, which were overthrown in the Red Sea, and leading us down to the fancy vehicles of the present heroes of the whip. We cannot follow the author through all the stages of his research in this species of lore; but as respects his comments upon the construction of modern carriages, we feel so strongly impressed with the accuracy of his remarks, that we should be disposed to say if any man in England knew how to mount his customers in the first style of elegance, and upon the soundest principles of science, Mr. Fuller must be the man.

The novelties proposed in the construction of carriages which are the invention of the author, are already before the world in some of our preceding pages, and certainly do great credit to his ingenuity. We strongly recommend a perusal of this little work to every gentleman who regards his safety and comfort: and also to all proprietors of public vehicles that have any respect to the lives and limbs of their passengers.

Novel Inventions.

AMERICAN PATENTS,
(FROM THE FRANKLIN JOURNAL.)

Specification of an improved mode of impressing figures on the rollers for calico printers, by etching; invented

by DAVID H. MASON, *and* MATTHIAS W. BALDWIN, *of Philadelphia.*

THE former method of making these mills was by punches, with figures of rosets, leaves, circles, pins, or other figures. The punches having on them the figure or device required, are driven into the steel cylinders or mill, and the metal raised up by the punch is faced off, and the parts united and trimmed with a graver; or the whole figure or device was cut in with a graver.

The improvement of the petitioners consists in *etching* the device on the mill, which we do in the following manner: A steel cylinder or mill is prepared, of suitable size, with pivots or journals, in the usual manner of making such mills; the mill is then coated with varnish, or etching ground, such as is used by engravers for covering their plates, in etching; the device is then traced through the varnish, or etching ground, with an etching needle, or steel points; the device being thus traced, the pivots or journals are coated with a varnish made with asphaltum and spirits of turpentine, so as to prevent the acid from acting on the mill, except where the device has been marked through the varnish with the etching needle, or steel point; the mill is then immersed in a prepared acid, in making which, we use the same kind of acid, (viz., aqua fortis, or nitrous acid,) which is used for etching on copper; but are careful not to have any copper in it. Our mode of preparing the acid is as follows; we dilute the acid in tha proportion of four or five of spring water to one of acid, and then dissolve in it as much tinfoil, or block tin, as it will take up, or until it ceases to effervesce; while in this operation, it must be in a bottle with the stopper out; this mixture is diluted in the proportion of

from eight to fifteen parts of water to one of the acid used in the first instance, according to the kind of work to be etched. For coarse work, the prepared acid should be strong; and for delicate work, it should be weak. This prepared acid is managed, in all respects, as nitrous acid is managed, by engravers on copper, except that generally in the prepared acid there are no bubbles by its action on the steel.

This process may be performed by any of the other preparations of acid used in biting soft steel; but that the above described we found to answer best.

When the mill or steel cylinder has been in the prepared acid a sufficient length of time, to bite in the figure, or device traced with the etching needle, or steel point, to the required depth, (which is ascertained in the usual way, by scraping off the varnish from a part of the device,) it is taken out, the coating of varnish removed, and the figure, or device, is finished with a graver, in the usual manner of finishing etching; the mill is then hardened, and a transfer taken from it to another steel cylinder or mill, so that the figure, or device etched, in the first, shall be raised on the second; in order that it may be impressed on the copper cylinder, to be used in the calico printing; all which transfers are made in the usual manner, and with the usual machinery for affecting such transfers of engravings.

What we claim as our invention, or improvement, is the *etching* of figures, or devices, on steel cylinders or mills, to be transferred to copper rollers for calico printing. We claim nothing more.

In testimony that the above and foregoing is a true specification of our said improvement, as here in before described, we have hereto set our hands and seals, this 12th day of October, in the year of our Lord 1827.

An improvement in the Process of making warm pressed Castor Oil from Castor Beans, invented or discovered by TIMOTHY PHARO, *of Tuckerton, New Jersey.*

Specification.— A kiln built of bricks, about five by six feet square, and four feet six inches high, is to be erected, and to be covered with tin or sheet iron, supported by small iron bars across the top. A wooden frame, from four to six inches deep, is placed on the edges of the top of the kiln, to confine the beans on the tin floor, while warming. A large sized iron stove is to be inclosed in the kiln, with the stove door on a line with one end of the kiln, for the purpose of keeping up the fire, to raise the proper heat. At the opposite end of the kiln, a small iron door is hung, for the purpose of opening and shutting occasionally, to graduate the heat.

When preparing to press the oil from the beans, the beans are to be placed upon the tin or sheet iron floor above described, where, by means of the heat raised by the fire kept up in the stove, the beans are warmed to any degree the manufacturer deems proper, and are thence removed into the iron churn, to be pressed with an iron screw, propelled by horse, steam, or water power.

The above described process of procuring the oil from the beans, is new and to be preferred; because,

1st. The beans are more expeditiously warmed, and saves the expense of the labour of one hand.

2nd. All danger of scorching them is avoided, and thereby the oil is saved from any disagreeable taste, and procured in the utmost purity.

3rd. The beans can be properly warmed and dried for pressing, even when in a damp state, which cannot be done by a cylinder.

Polytechnic and Scientific Intelligence.

St. Helena Silk.

A specimen of raw silk produced in the island of St. Helena, has arrived in England. It is the first perfect one, and is considered as being of very fine quality. It is entirely free from any disagreeable odour, which is much in its favour. In last August, the number of worms in progress, was 218,000, which were in a very healthy condition, and expected to spin in a few days. The mulberry trees thrive well, and have a very luxuriant appearance.

Gelatinous Substance supposed to have fallen from the Atmosphere.

ONE of these gelatinous masses, which, being found in meadows, are often supposed to have fallen from the atmosphere, was taken to Dr. Brandes, who examined and made out its nature with considerable certainty. It equalled about 2¼ cubical inches, was white, and resembled swelled tragacanth; it was covered in several places with a fine skin, which had burst here and there, and allowed a bulky gelatinous mass to protrude. The bursting had occurred from swelling, caused by the absorption of moisture. When entire, it showed a vermicular appearance, of the thickness of a quill, having the figure of an intestine. The back was marked by a tender vessel of a dark brown colour. In a dry place, the substance shrunk, became yellowish brown and tough, like glue, and at last horny; twenty grains were reduced to four grains by desiccation. Being moistened with water, it swelled up to its former size and colour. 100 grains, boiled in three ounces of water, converted the whole into a tremulous

mass when cold. 100 parts gave 18.8 of gelatinous substance, 1.2 phosphate of lime, and phosphate of soda, and 80 of water.

This substance Dr. Brandes concludes to have been the spawn of a *limax rufus*, or some other species of limax swelled by water; and the supposition was confirmed, on finding, in a portion of the substance placed in a cup for a few days, a little naked snail, (limax,) about a quarter of an inch long. The spawn, although small at first, swells by moisture, and hence the reason why these substances are usually found in meadows and moist situations. Mr. Brandes considers and reconciles the observations of M. M. Buchner and Schwabe with his own.

Globules of the Blood.

M. Raspail states that the globules of the blood vary in diameter, according to the organs which supply the blood under examination, contrary to the general opinion, which considers their diameter as constant and invariable in every part of all individuals of the same species.

List of Patents

GRANTED IN THE UNITED STATES OF NORTH AMERICA, FROM JUNE 1ST, TO AUGUST 22ND, 1827,

FOR INVENTIONS AND IMPROVEMENTS.

Improvement in riding, wheel, carriages, William and Josiah Jessop, Guilford County, N. C. June 1.

In the construction of cast iron foot-stoves, George W. Robinson, New York, June 2.

In the saw mill, Anthony Bencine, Milton, Caswell County, N. C, June 4.

In the machine for nets to pine apple cheese, Lewis Mills Norton, Litchfield, Conn. June 4.

In the grist mill for grinding grain, with the periphery of the stone, Robert S. Thomas, of Rockingham, Richmond County, N. C. June 4.

In the cotton or hay press, Thomas D. Wilson, Corydon, Harrison County, Indiana, June 6.

In the water wheel, Thomas D. Wilson, Corydon, Harrison County, Indiana, June 7.

In the machine for churning butter, Nathan Whitney, Augusta, Maine, June 7.

In the mode of letting the water on water wheels, Jacob Ammon of Rockingham County, Virginia, June 8.

In constructing culinary fixtures for anthracite coal, Jacob F. Walter, Philadelphia, June 8.

In an apparatus for spinning wool and cotton, &c. William Church, Birmingham, England, June 11.

In the bellows, Jesse Dixon, Pittsborough, Chatham County, N. C. June 11.

In the grist mill, patented by Moses Medenhall, October 20, 1826, Samuel Lawing and James Monteith, Statesville, Iredell County, N. C. June 11.

In a machine for preparing mortar, and grinding apples for cider, &c. Thomas Streeter and James Wibirt, of Chili, Monroe, New York, June 12.

In the machine for boring earth, John R. Failing, Canajoharie, Montgomery County, New York, June 13.

In stills, Malcolm M'Gregor, of New York, June 15.

In the steam engine, John Maynard, of Ovid, New York, June 15.

In the grist mill, William W. Forwood, of Hartford County, Md. June 15.

In the mill for grinding corn and other grain, called the sugar-loaf mill, Sidney Moore and Portius Moore, of Mount Irzah, Person County, N. C. June 15.

In the discovery of a certain composition of matter, whereby scagliola is rendered more shining, vivid, and beautiful, Salvadore Pinistri, of New York, June 18.

In the cork cutter, Luther Hills, of Boston, June 18.

In the boot crimping, or boot blocking machine, Samuel Morehouse, of Eastport, Maine, June 19.

In the engine for dividing scales, gauges, rules, &c. Samuel Hedge, of Windsor, Vermont, June 20.

In suspenders, Edwin Chesterman, of New York, June 19.

In the grist mill, for grinding grain of any kind, William A. Turner, of Plymouth, Washington County, N. C. June 27.

In the machine for dicing, and polishing, or rolling morocco leather, Samuel Couillard, jr. of Boston, Massachusetts, June 27.

In the machine for sawing shingles out of planks, &c. Nathan Swift, of Lebanon, Conn., June 27.

In the washing machine, David Beard, of Buffaloe, New York, June 27.

In the plough, William Beach, of Philadelphia, June 27.

In the machine for hewing and hammering stone, Charles B. Reed, of West Bridgewater, Plymouth County, Massachusetts, June 27.

In the machine for spinning wool, Benjamin Lapham, of Queensburg, Warren County, New York, June 29.

Improvement in the horse harness, called a horse yoke, Adolphus Allen, of Troy, New York, June 29.

In preventing friction on spindles, called serve wheels, Johann Gottleib, Sholze, Pickaway Township, Ohio, July 6.

In the percussion gun-lock, Marvel C. Davis, of Mayville, Chataugue County, New York, July 10.

In a mortising machine, Simon Leroy, of Mexico, Union Square, Oswego County, New York, July 10.

In manufacturing steam and rotatory wheel engines, Francis Harris, of Albany, New York, July 10.

In the mode of manufacturing wool or other fibrous material, John Goulding, of Dedham, Norfolk County, Massachusetts, July 10.

In the machine for roping and spinning wool and cotton by hand, called "Brown's vertical spinner," Henry Wilson, of Pomfret, Chataugue County, New York, July 13.

In the means of transporting a boat, or other body, from one canal level to another, Robert P. Bell, of New York, July 13.

In cements for roofs, or walls of buildings, &c. Charles Clinton, of New York, July 13.

In the screw auger, Judson Smith, of Derby, New Haven County, Conn. July 13.

In the hand printing press, Samuel Couillard, of Boston, July 14.

In the machine for bending tire of carriage and other wheels, metallic bands, and hoops, &c. Walter James, of Ashford, Windham County, Conn. July 14.

Improvement called Cooper's rotative piston, John M. Cooper, of Guildhall, Essex County, Vermont, July 16.

In the mode of conveying or hauling earth, stone or other substances, from the bottom of canals, or other cuttings in the earth, by machinery, Oliver Philips, of Lansing, Tompkins County, New York, July 16.

In the grist mill, Washington Adams, Guildford County, N. C. July 18

In fermenting and distilling spirits, Ira Belnap, Millersburg, Dauphin County, Pennsylvania, July 20.

In the manufacture of gas-lights from cotton seed, Denison Olmsted, New Haven, Conn. July 21.

In the portable crane, for raising brick, stone, mortar, timber, goods, &c. Ezekiel Mann, and George Hill, of Rochester, Monroe County, New York, July 21.

In the grist mill, Avery Coe, and John Coe, of Guildford County, N. C. July 21.

In the bush for a mill stone, Nathan Taylor, Urbana, Steuben County, N. Y July 23.

In the mode of making cordage by machinery, Robert Graves, Brooklyn, N. Y. July 25.

In the mode of passing canal boats up and down elevations, by machinery, Robert Graves, Brooklyn, N. Y. July 26.

In the machine for making cooper's staves, ready for the tress-hoop, Amory Amsden, Bloomfield, Ontario County N. Y. July 27.

In the machine for spinning wool and cotton, called the family spinner, William W. Jones, Thornville, Perry County, Ohio, July 27.

In the construction of rail-way carriages, Richard P. Morgan, Stockbridge, Massachusetts, July 27.

In the machine for cutting straw, Laban Durham, and John S. Pleasants, of Halifax County, Virginia, July 27.

In the machine for cutting wheat, oats, &c. by horse power, Laban Durham, and John S. Pleasants, of Halifax County, Virginia, July 28.

In a machine called an up and down revolving water wheel, for raising water, Henry Miller, of Allentown, Northampton, Pennsylvania, July 28.

In the cast-iron horse hoe, for ploughing and weeding grains and herbs, planted in hills and rows, William Carmichael, Land Lake, Renssalaer County, N. Y. July 28.

In the machine for warning or notifying the drivers of carriages, called the coach alarm, Walter Hunt, of N. Y, July 30.

In the manufacture of hollow wooden ware, Elisha Briggs, of Perry, Gennesse County, N. Y. July 30.

In the method of cooling water or other fluids, William Thornton, of Washington City, D. C. July 31.

In a machine called Schreiner's chimney smoke, and safety valve, Joseph H. Schreiner, of Philadelphia, Pennsylvania, July 31.

In the mode of moving brick, stone, or wooden buildings, with the chimnies, furniture, and families therein, Simeon Brown, of N. Y. July 31.

In the harrow and plough hoe, or a new method of attaching hoes of different descriptions to the helve of the harrow and plough, for cultivating corn, wheat, rye, oats, cotton, tobacco, &c. Isham Cheatham, of Providence, Chesterfield County, Virginia, July 31.

In the machine for cutting card teeth, Joshua Lamb, of Leicester, Massachusetts, August 1.

In the tide mill, Robert Spedden, of Talbot County, Md., August 1.

In the machine for dressing, drilling, and working granite, and other kinds of stone, Hermon Bourne, of Salem, Essex County, Massachusetts, August 3.

In a machine called the sack shoulderer, Lewis Rice, of Clarksboro, Gloucester County, New Jersey, August 3.

In a machine called the economical victualler, being an improvement on the peripurist, Benjamin C. Burdett, of New York, August 4.

In the mode of tightening bed sackings, called the improved detached screw bed sacking, John K. Simpson, Boston, Massachusetts, August 10.

In the machine for separating the seed from cotton, called the Sea Island cotton cleanser, Jesse Reed, of Marshfield, Plymouth County, Massachusetts, August 10.

In the thrashing, winnowing, and flax breaking machine, Edmund Warren, N. Y. August 10.

In a machine for removing stumps, and other heavy and fixed bodies, Abijah Pratt, of Jackson, Washington County, N. Y. August 17.

In the steam engine, Warren P. Wing, of Greenwich Village, Hampshire County, Massachusetts, August 17.

In the machine for separating, or thrashing grain from the straw, and for breaking flax and hemp, Peter Barker, of Worthington, Franklin, Ohio, August 20.

In the plough, called the right and left plough, George Doffer, Fredericktown, Md., August 20.

In the method of determining the proof and strength of distilled, or alcoholic spirit, William Cornell, Brooklyn, N. Y. August 20.

In the water wheel, for saw and grist mills, James Deniston, of Lanier Township, Preble County, Ohio, August 22.

In the construction of a sofa and bedstead united, which may be used for either purpose, John R. Penniman, Boston, Massachusetts, August 22.

In the gearing of cones, for bowing hats, Trueman F. Mayhew, Boston Massachusetts, August 22.

In the hydraulic elevator, David Corey, of N. Y. August 31.

In the carding machine, John Tillon, of New Town, Fairfield County, Conn., September 8.

In the machine for moulding brick and tile, Ezra Fisk, and Benjamin Hinckley, of Fayette, Kennebeck County, Maine, September 8

List of Patents

GRANTED IN SCOTLAND, 1828.

For an improvement or improvements on or in refrigerators for cooling fluids. To Robert Wheeler, County of Bucks, Jan. 4.

For improvements in safety lamps. To Thomas Bouner, County of Durham, Jan. 4.

For an improved method of constructing and working an engine for producing power and motion. To William Parkinson, county of Lincoln, Jan. 10.

For a new or improved method or methods of propelling vessels through or on the water by the aid of steam or other mechanical force. To William Nairn, County of Mid-Lothian, Jan. 17.

For an improvement or improvements in making paper by machinery. To George Dickinson, County of Kent, Jan. 22.

For a new and improved method of ballasting ships or vessels. To Ralph Rewcastle, of Newcastle-upon-Tyne, Jan. 29.

For an improvement in applying heat to the purpose of distillation. To Robert Stein, County of Middlesex, Feb. 13.

For certain improvements in that part of the process of paper making which relates to the cutting. To Thomas Bousor Crompton, County of Lancaster, Feb. 13.

For certain improvements in machinery for propelling boats and other vessels, which improvements are also applicable to water wheels and other purposes. To George Jackson, City of Dublin, Feb. 23.

For certain improvements in machinery for propelling vessels, which improvements are applicable to other purposes. To Paul Steenstrup, Esq. City of London, March 10.

For certain improvements on power looms for the weaving of silk, cotton, linen, wool, flax and hemp, and all mixtures thereof. To John Harvey Sadler, county of Middlesex, March 19.

For improvements in making healds for weaving purposes. To William Pownall, County of Lancaster, March 25.

For improvements in the manufacture of buttons and in the machinery or apparatus for manufacturing the same. To Thomas Tyndall, County of Warwick, March 25.

For a new or improved method or methods of propelling vessels through or on the water by the aid of steam or other means or power, and which may also be applied to other purposes. To John Lee Stevens, of Plymouth, March 25.

For certain improvements in machinery for the manufacture of bobbin net lace. To John Levers, of Nottingham, April 3.

For certain improvements in making iron, or in the method or methods of smelting and making of iron. To Thomas Botfield, County of Salop, May 6.

For certain improved machinery for breaking or preparing hemp, flax, and other fibrous materials which he denominates "the rural mechanical brake." To Count de la Garde, County of Middlesex, May 19.

For certain improvements in the construction and fastening of made masts. To Thomas Hillman, County of Middlesex, May 19.

For certain improvements in cutting paper. To Edward Cowper, County of Surrey, May 19.

New Patents Sealed in 1828.

To Anton Bernhard, of Finsbury Square, in the County of Middlesex, engineer, for a method, principle, or apparatus for raising of water or other fluids.—Sealed 24th July—6 months.

To Robert Wornum, of Wigmore Street, Cavendish Square, in the County of Middlesex, piano-forte maker, for certain improvements on upright piano-fortes. 24th July—2 months.

To Joseph Clisild Daniell, of Lumphey Stoke, in the Parish of Bradford, in the County of Wilts, clothier, for certain improvements applicable to the manufacturing and preparing of woollen cloth. 5th August. 6 months.

To John Lane Higgins, of Oxford Street, in the County of Middlesex, gentleman, for certain improvements on wheel carriages. 11th August. 6 months.

To William Mencke, of Park Place, Peckham, in the County of Surrey, gentleman, for certain improvements in preparing materials for, and in the making or manufacturing of bricks. 11th August. 6 months.

To Lewis Roper Fitzmaurice, of Jamaica Place, Commercial Road, in the County of Middlesex, master in the Royal Navy, for improvements on ships and other pumps, which improvements are also applicable by certain alterations to turning lathes and other purposes. 11th August. 6 months.

To William Grisenthwaite, of the Town of Nottingham, esq., for a new process for making sulphate of magnesia, commonly called Epsom salts. 11th August. 6 months.

To Henry Maxwell, of No. 99, Pall Mall, in the County of Middlesex, spur maker, for an improvement in spring spur sockets. 13th August. 2 months.

To Thomas Stirling, of the Commercial Road, Lambeth, in the County of Surrey, for certain improvements in filtering apparatus. 16th August. 6 months.

To Benjamin Matthew Payne, of the Strand, in the County of Middlesex, scale maker, for certain improvements on weighing machines. 18th August. 6 months.

To Edward Barnard, of Nailsworth, near Minchinhampton, in the County of Gloucester, clothier, for certain improvements in weaving and preparing cloth. 19th August. 6 months.

To Philip Foxwell, clothier, William Clark, cloth-dresser, and Benjamin Clark, cloth-dresser, all of Dye House Mill, in the Parish of Minchinhampton, in the County of Gloucester, for certain improvements on machinery for shearing, cropping, or cutting and finishing woollen, and other cloths and casimeres. 19th August. 6 months.

To William Sharp, of Manchester, in the County Palatine of Lancaster, cloth spinner, for certain improvements in machines for spinning or roving of cloth, silk, wool, or other fibrous substances. 19th August. 6 months.

CELESTIAL PHENOMENA FOR SEPTEMBER, 1828.

D.	H.	M.	S.	
1	0	0	0	☉ before the Clock 15'
5	0	0	0	☉ before the Clock 1' 32"
5	3	0	0	☾ in conj. with ♀ long. 2° in Cancer, ☾ lat 5° 1'. S. ♀ lat. 5° 29'. S. diff. lat. 28'
5	20	0	0	☾ in conj. with 1 α in Cancer.
5	21	0	0	☾ in conj. with 2 α in Cancer.
6	4	0	0	♂ in conj. with σ in Sagitt.
6	19	0	0	☾ in conj. with ο in Leo.
7	5	0	0	☾ in conj. with π in Leo.
7	11	0	0	☿ in conj. with σ in Leo.
8	20	33	0	Ecliptic conj. or ● New Moon.
10	0	0	0	☉ before the Clock 3' 12"
11	21	0	0	☿ in conj. with β in Virgo.
12	14	0	0	♂ in conj. with τ in Sagitt.
12	17	0	0	☽ in conj. with λ in Virgo.
13	6	0	0	☽ in conj. with ♃ Long. 10° in Libra. ☽ lat. 2° 9' N. ♃ lat. 54' N. diff. lat. 15'
14	3		0	☽ in conj. with 4 ξ in Libra.
14	12	0	0	☽ in conj. with ϑ in Libra.
15	0	0	0	☉ before the Clock 4' 57"
16	11	26	0	☽ in □ first quarter.
16	13	0	0	☿ in conj. with η in Virgo.
17	0	0	0	♂ in conj. with ψ in Sagitt.
18	3	0	0	♃ in conj. with 2 α in Libra.
19	3	0	0	☾ in conj. with β in Capri.
20	0	0	0	☉ before the Clock 6' 42"
21	3	0	0	☾ in conj. with ϑ in Aquarius.
22	14	20	0	☉ enters Libra.
23	2	12	0	Ecliptic Opposition, or ☉ Full Moon.
24	2	0	0	☾ in conj. with ε in Pisces.
24	6	0	0	☾ in conj. with ξ in Pisces.
24	20	0	0	☾ in conj. with ο in Pisces.
25	0	0	0	☉ before the Clock 8' 25"
27	9	0	0	☿ in conj. with ξ in Leo.
27	17	0	0	☾ in conj. with 1 δ in Taurus.
27	18	0	0	☾ in conj. with 2 δ in Taurus.
30	0	0	0	☉ before the Clock 10' 6"
30	9	7	0	☾ in □ last quarter.

☽ The Waxing Moon.—☾ The Waning Mon.

Rotherhithe. J. LEWTHWAITE.

METEOROLOGICAL JOURNAL, FOR JULY AND AUGUST 1828.

1828.	Thermo.		Barometer.		Rain in inches.	1828.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low	High.	Low.			Hig.	Low.	High.	Low	
JULY						AUG.					
26	66	53	29,68	29,64	,1	11	68	49	29,66	29,64	
27	66	49	22,61	29,72	,125	12	64	52	29,76	29,68	,25
28	66	54	29,94	29,90		13	66	43	29,77	29,68	,25
29	64	48	29,94	29,86	,1	14	58	53	29,64	29,52	1025
30	62	46	29,95	29,86		15	68	48	29,84	29,76	,2
31	68	44	29,98	29,89	,025	16	68	41	29,86	Stat.	
AUG.						17	70	48	29,85	29,84	,1
1	70	58	29,97	29,84		18	70	50	29,90	29,81	
2	62	53	29,71	29,61		19	69	48	30,07	29,96	
3	67	53	29,59	29,55	,1	20	71	48	30,06	29,95	
4	66	50	29,51	29,50	,175	21	66	48	29,83	29,74	
5	70	50	29,56	29,51	,2	22	62	48	29,60	29,59	
6	66	46	29,50	29,36	,025	23	66	48	30,00	29,90	,1
7	70	54	29,43	29,36	,4	24	74	45	30,16	30,10	
8	70	57	29,56	29,50	,125	25	75	53	30,16	30,15	
9	66	50	29,48	29,41							
10	69	55	29,59	29,54	,1						

LOWER EDMONTON. CHARLES H. ADAMS.

Lat: 51° 37' 32" N. Long. 3' 51" W. of Greenwich.

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SECOND SERIES.

Reports of Recent Patents.

SHACKELL AND CARFRAE, PRINTERS, BARTLETT'S PASSAGE, HOLBORN.

Stile's Air Pump.

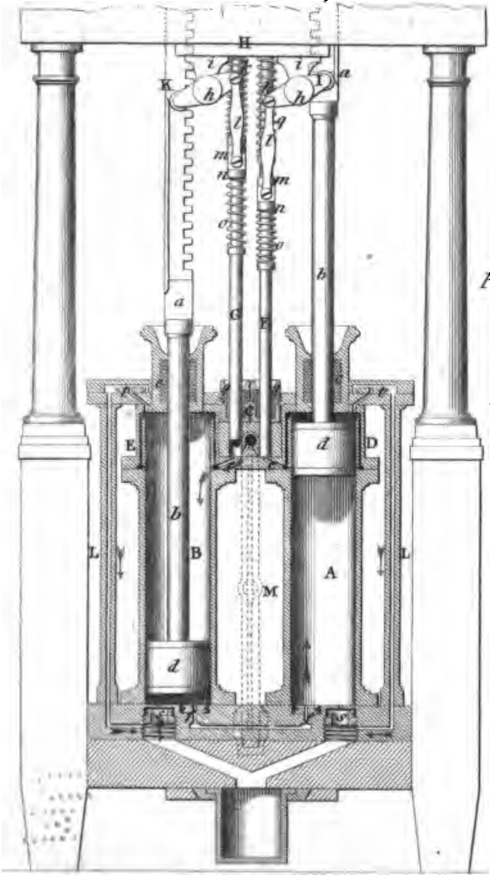


Fig: 1.

Fig: 2.

Shuttleworth's Improved Printing Machine.

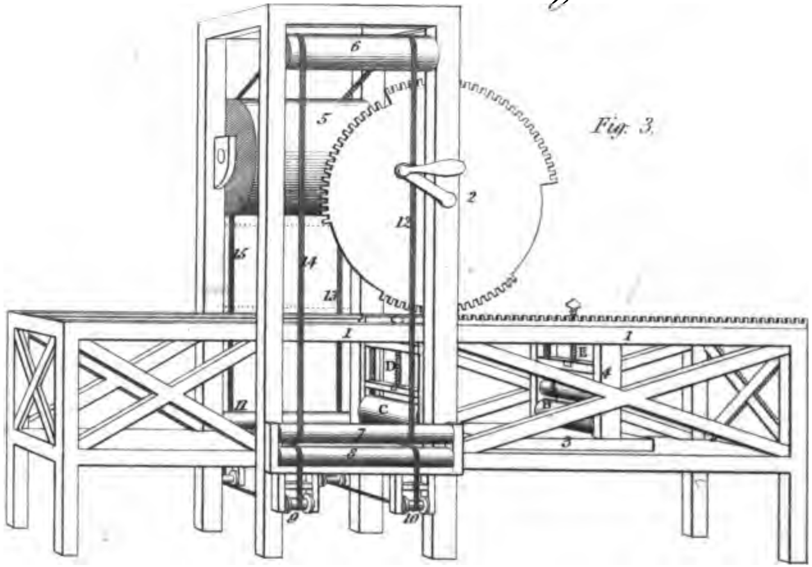
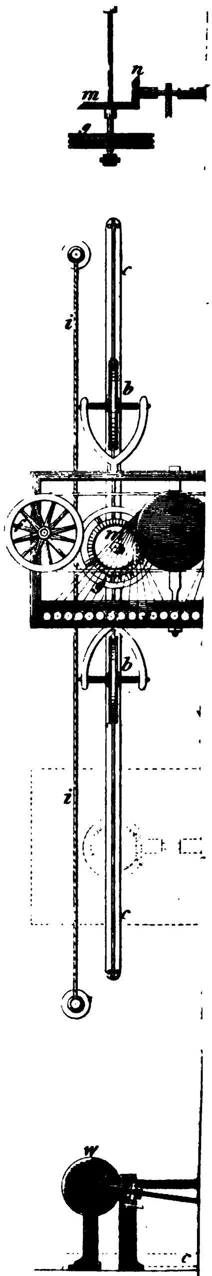


Fig: 3.

1st April 1828.

G. Gladwin sc.



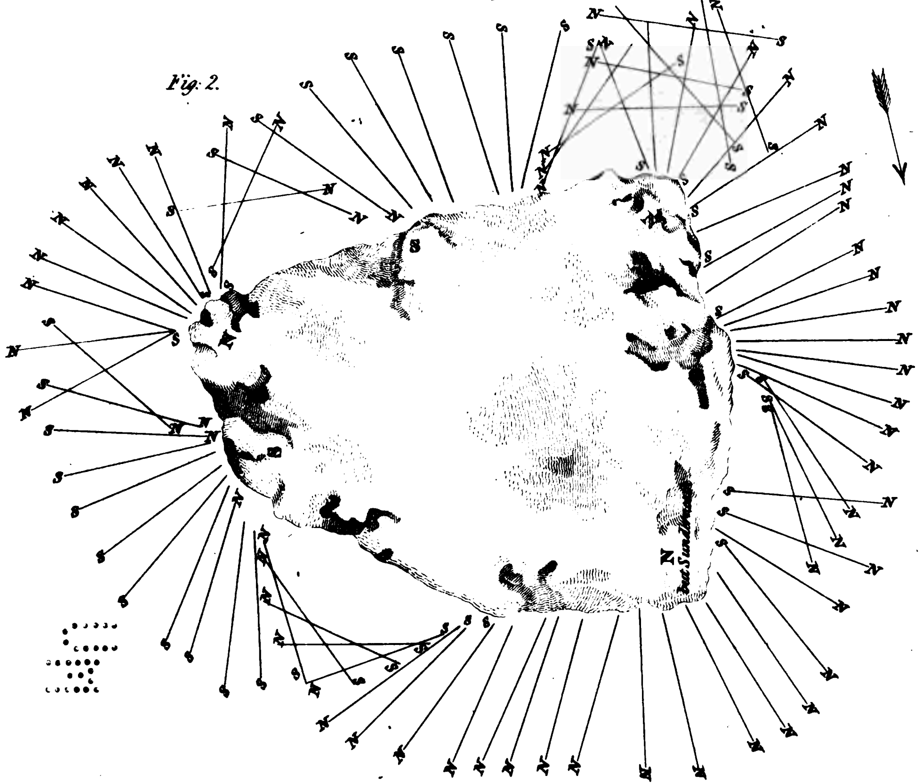
W. Newton del.

G. Gladwin sc.

1st May 1826.

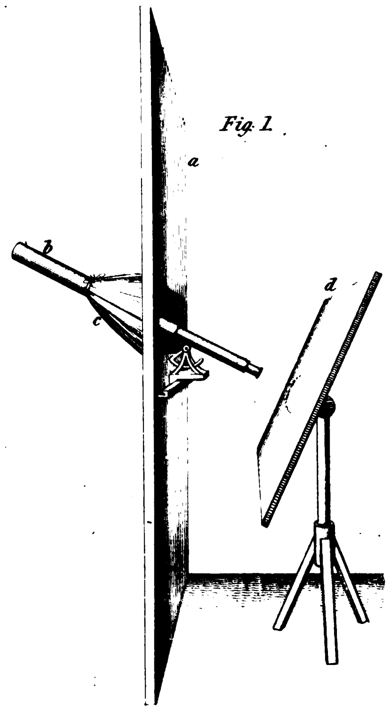
Curtis on the Load-stone.

Fig. 2.



Mode of observing the Spots on the Sun.

Fig. 1.



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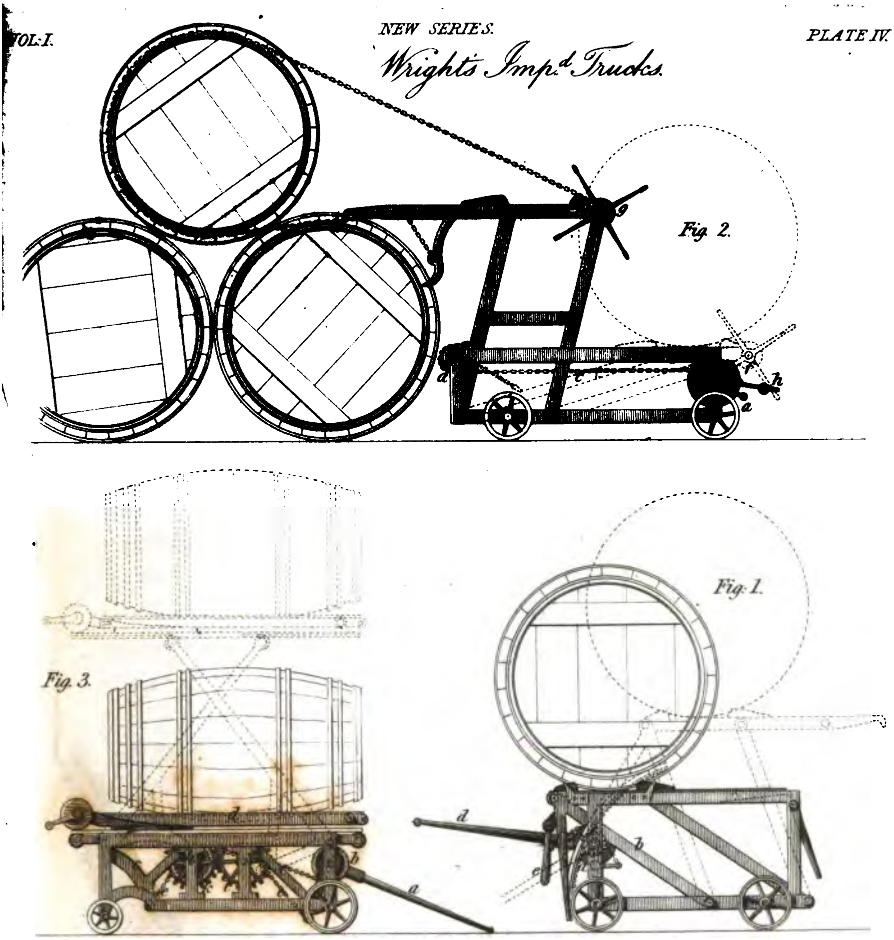
Wright's Imp.d Trucks.



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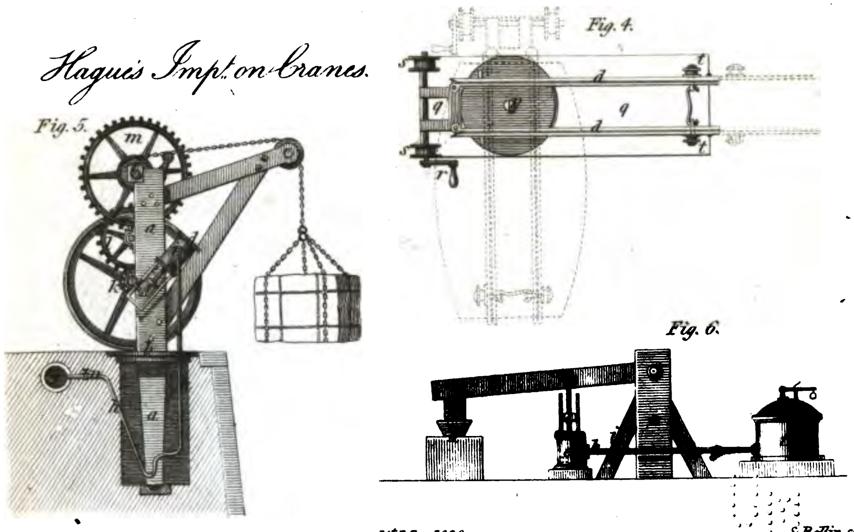
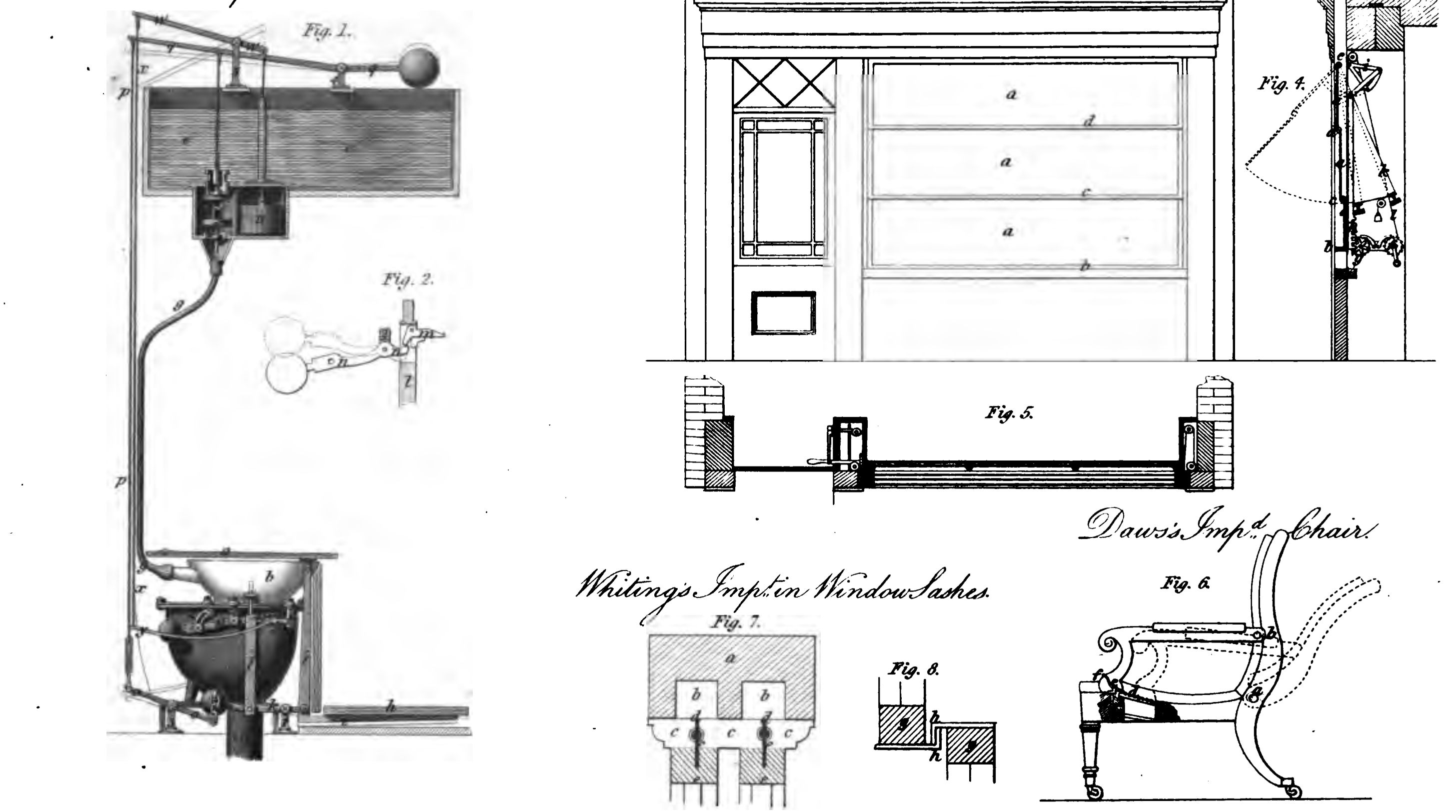


Shenton's Imp.d Water Closet.

Don & Smith's Imp.t in Window Shutters &c.



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Daws's Imp.d Chair.

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Oldham's Steel Furnace.

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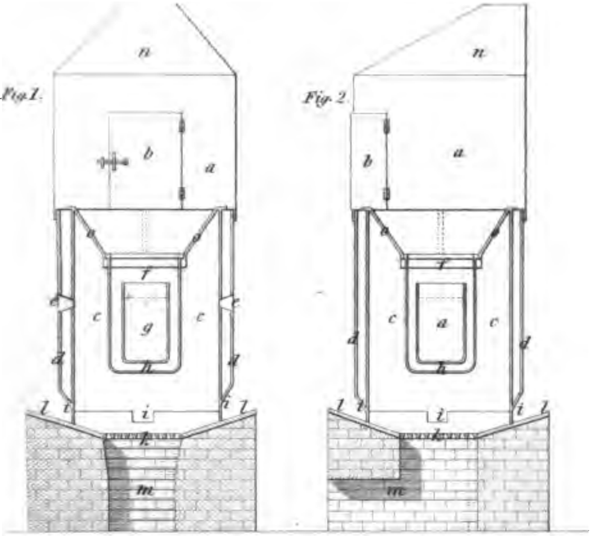
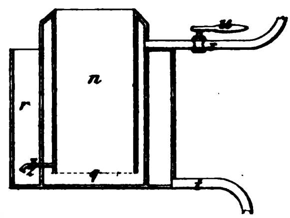


Fig. 3.



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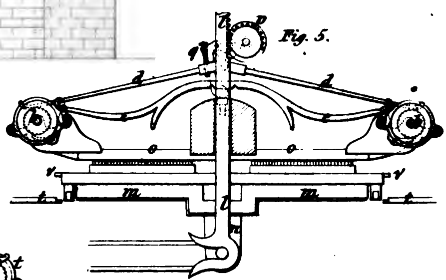


Fig. 6.

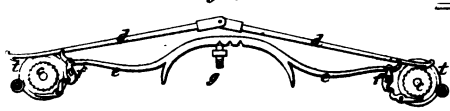
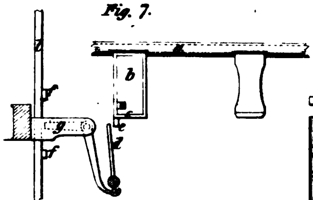


Fig. 8.

Fig. 7.



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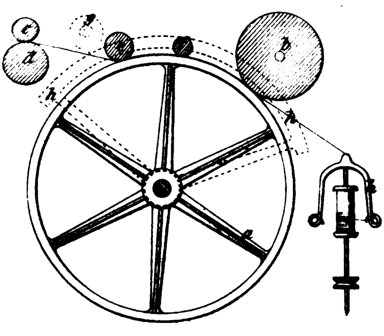

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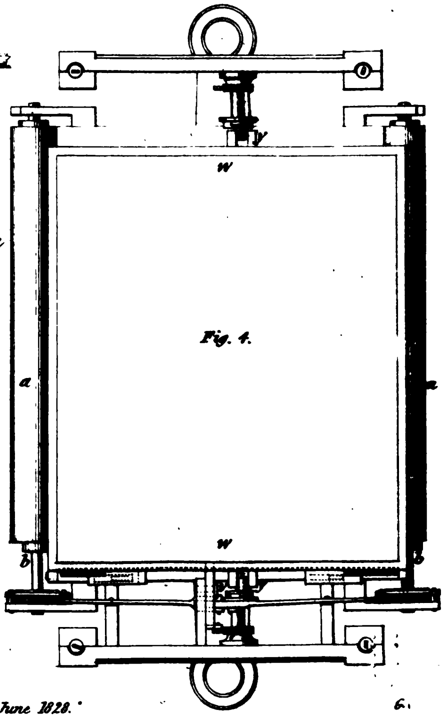

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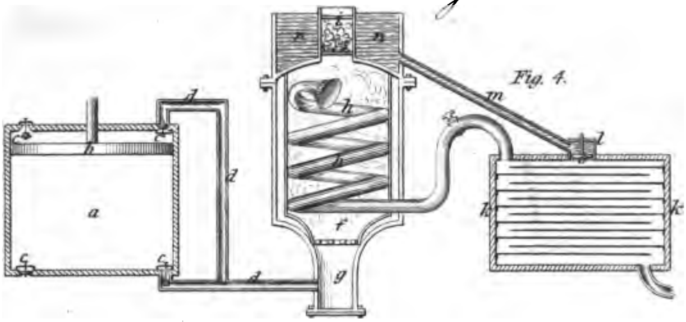

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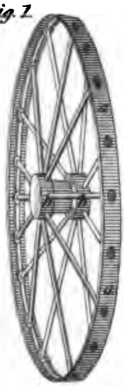
Fig. 1.



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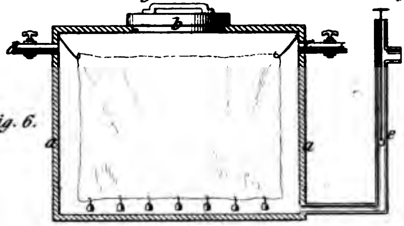

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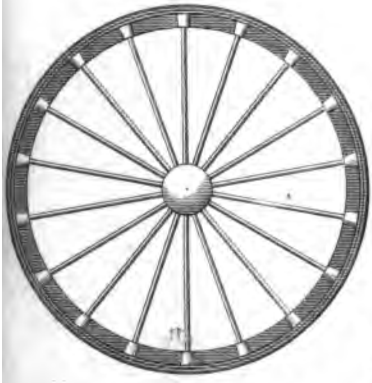

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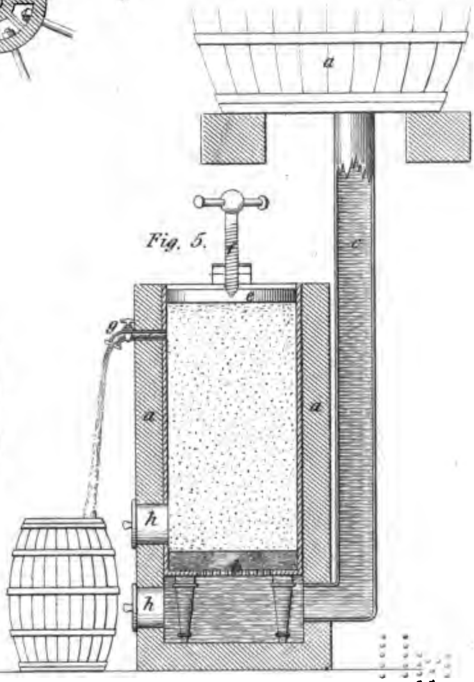
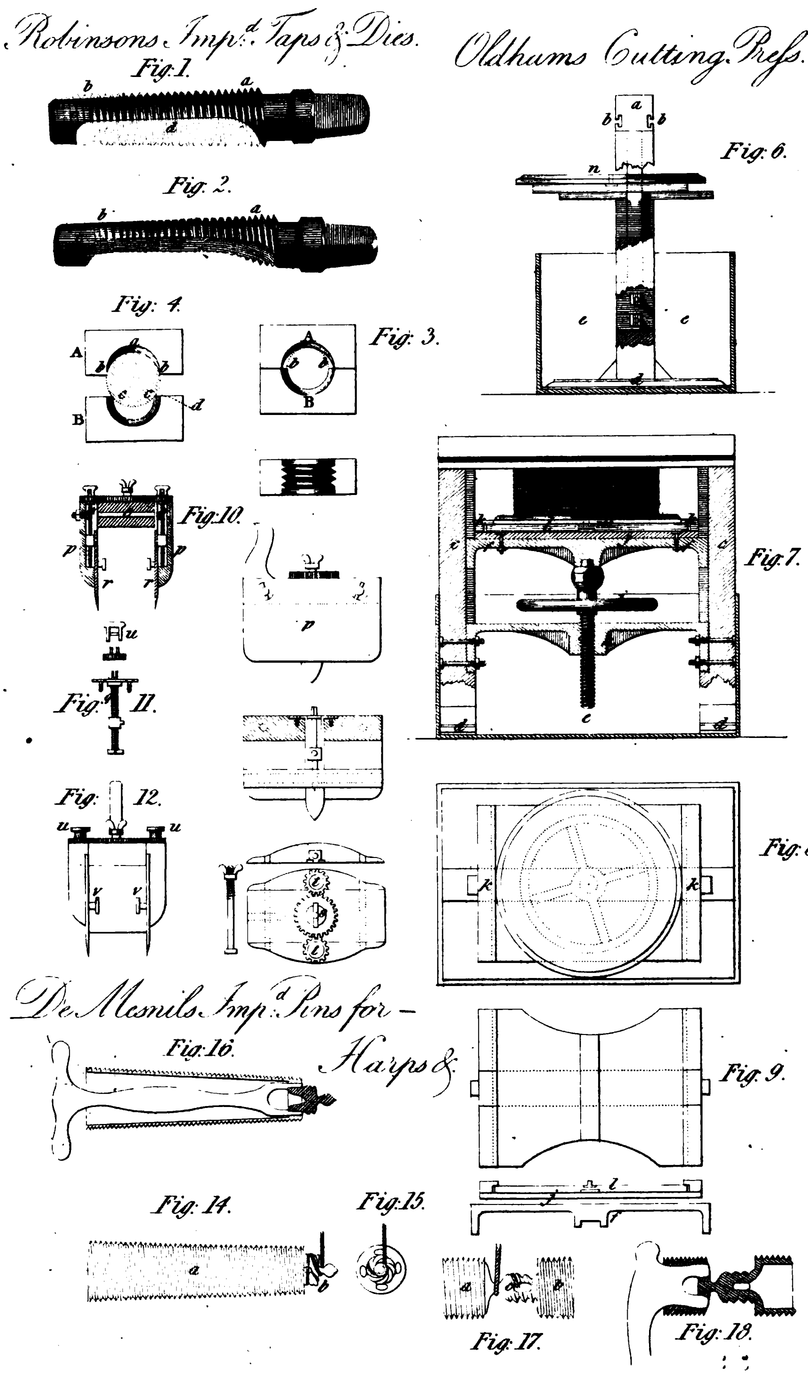
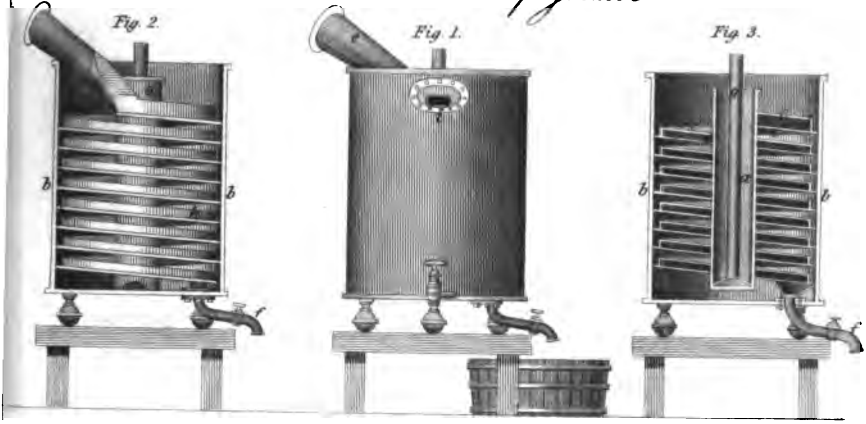


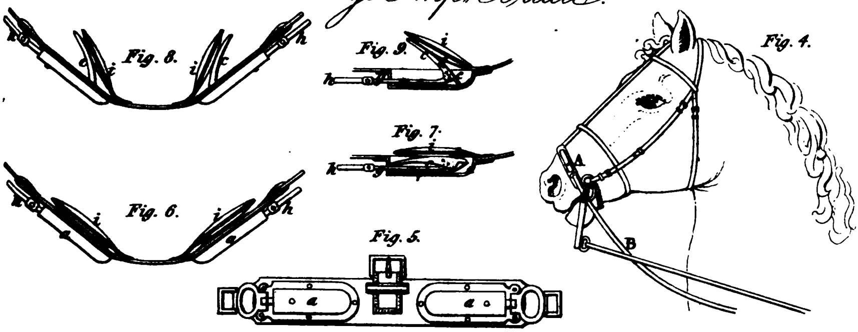


W. Newton Delt. 1st July 1828. T. Phillibrown Sculp.

Wheeler's Condenser & Refrigerator.



Otway's Imp.d Bridle.



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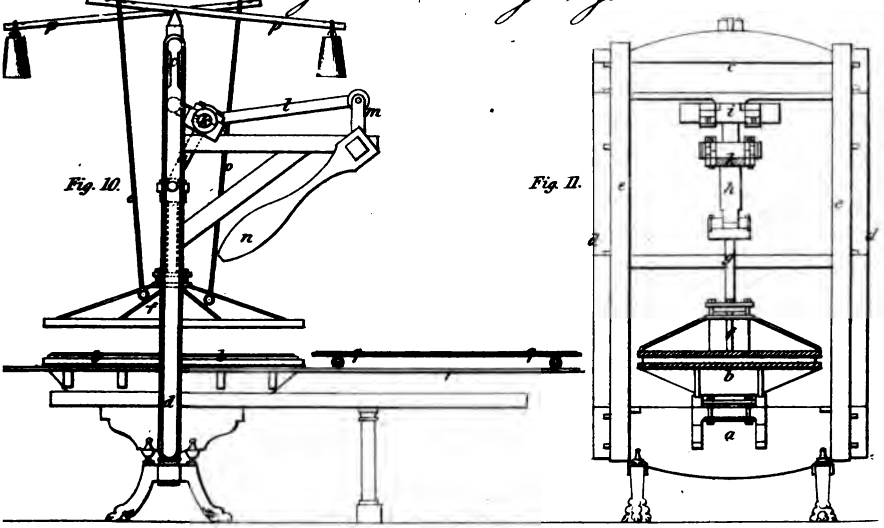


rton del. 1st July 1828. G. Gladwin sc.

Steven's Impd. Paddles.

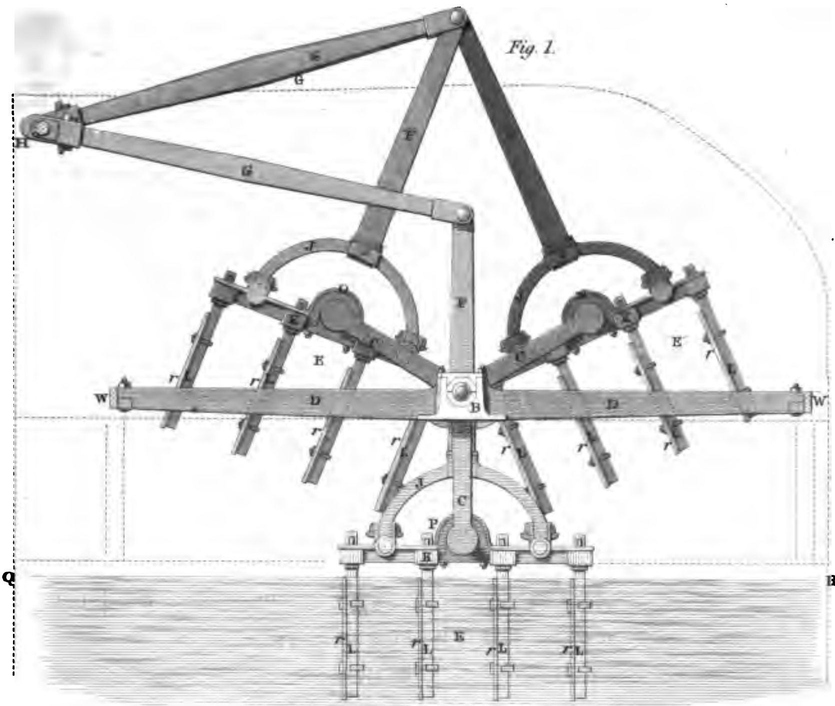


Fig. 1.

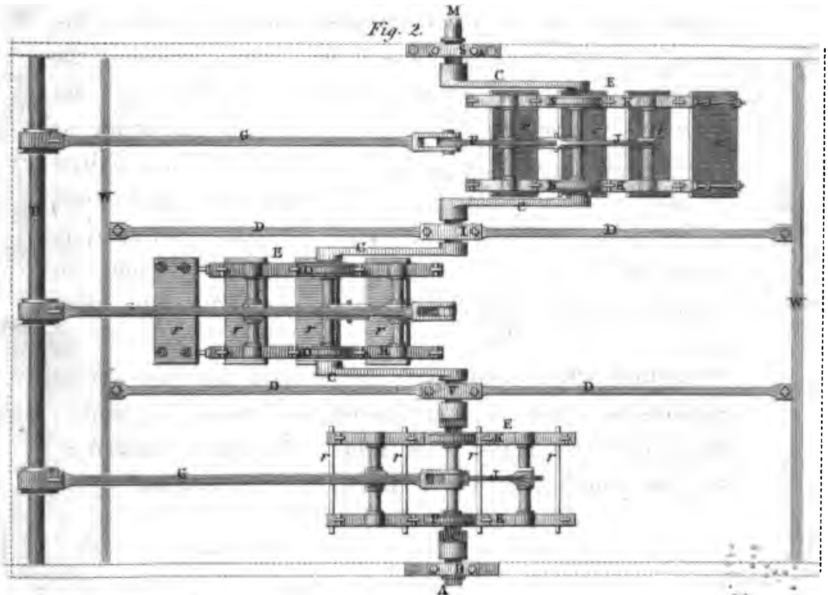
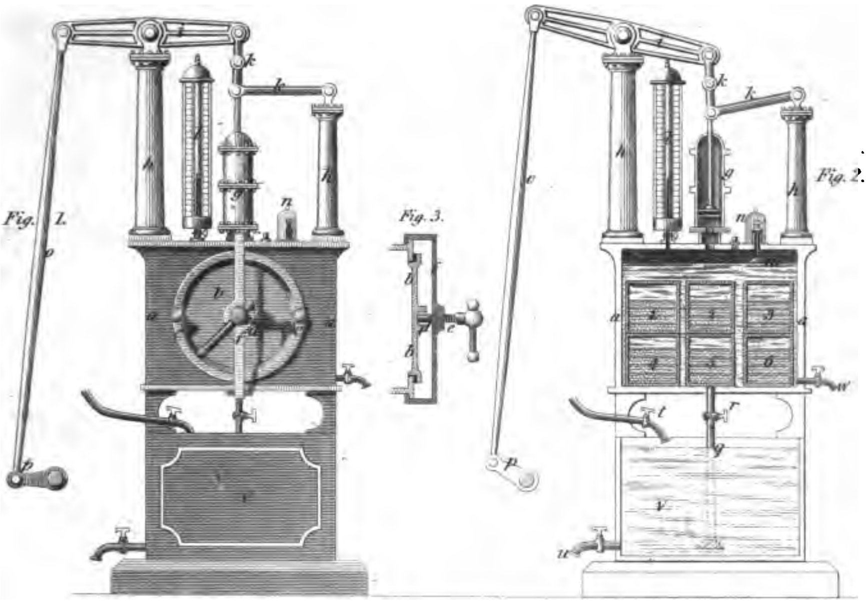


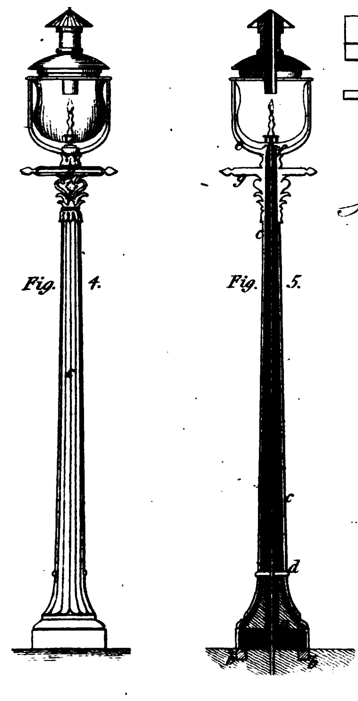
Fig. 2.

W Newton del. 1st July 1828. J. Bacon sc.

Oldham's Apparatus for Wetting Paper for Printing.



Robison's Street Lamp.



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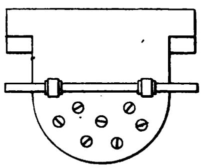
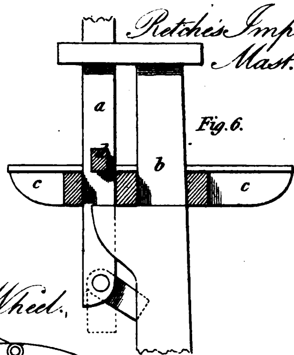
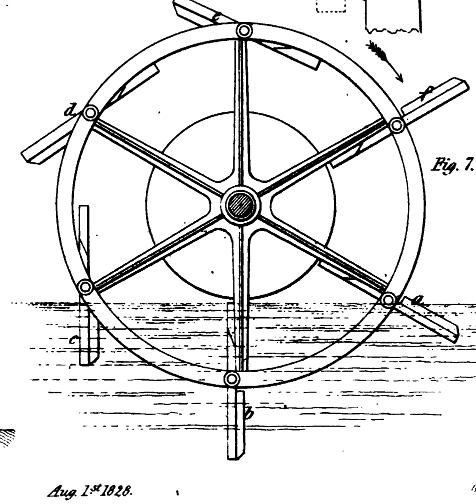


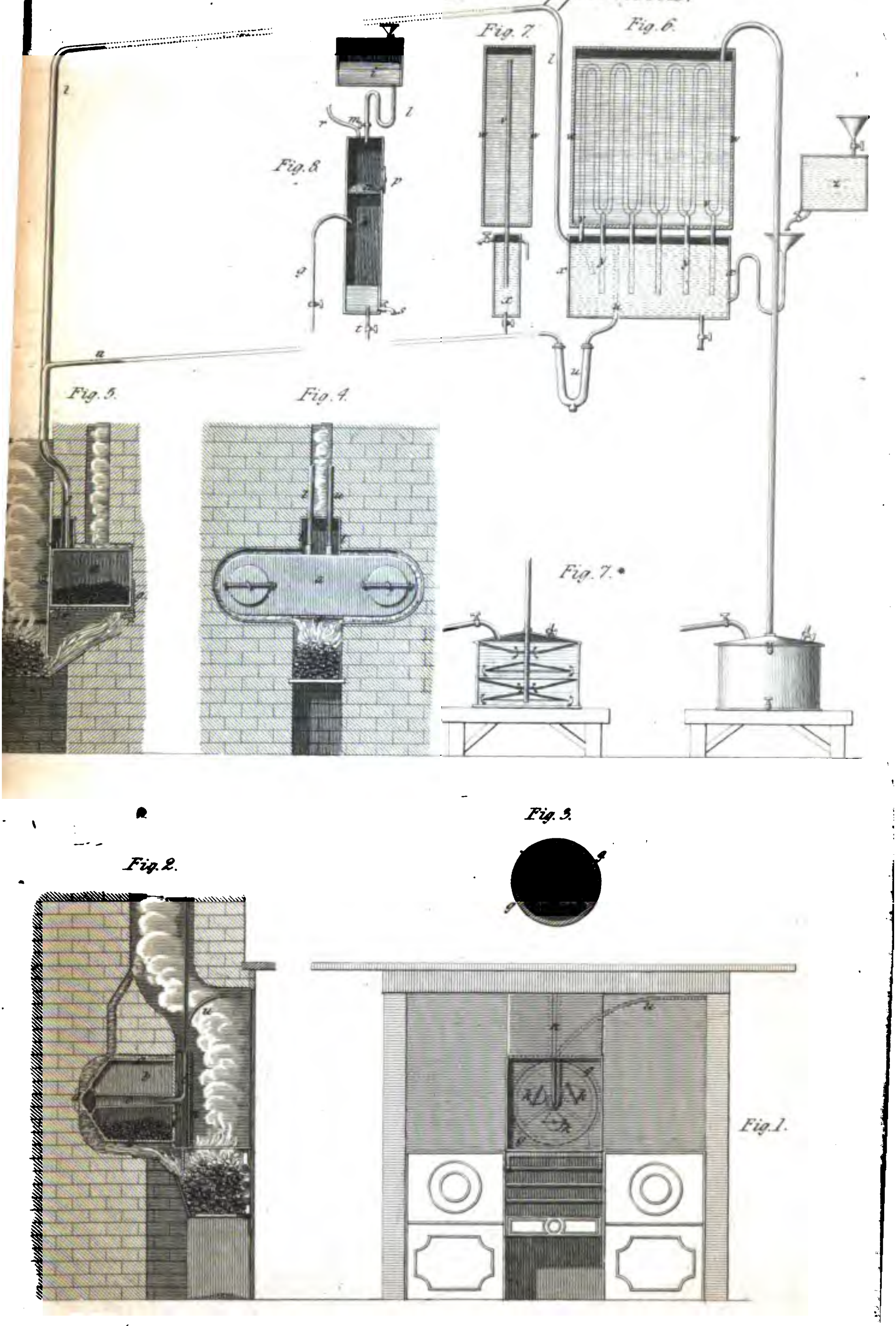
Ritchie's Impd. Mast.



Skene's Paddle Wheel.



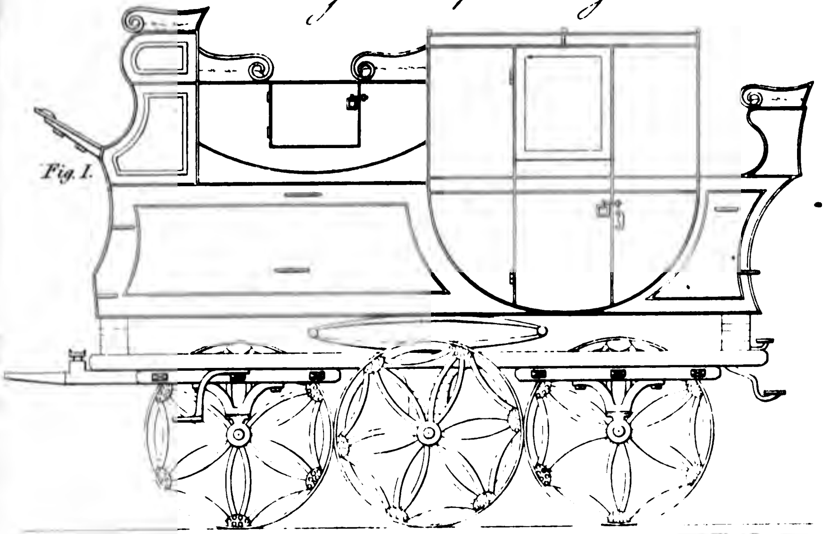
Pinkus's Domestic Gas Apparatus.



W. Newton Delt. 1 August 1828. T. Phillibrown Sc.

Burgess's Impd. Carriage.

Fig. 1.



Jenour's Shot Cartridge.

Fig. 5.

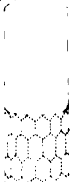


Fig. 2.

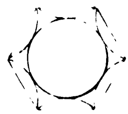


Fig. 3.

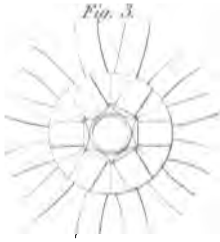


Fig. 4.

Parkinson's & Crosley's Power Engine.

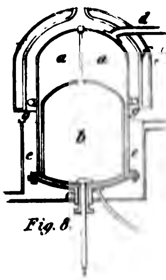


Fig. 8.

Fig. 6.

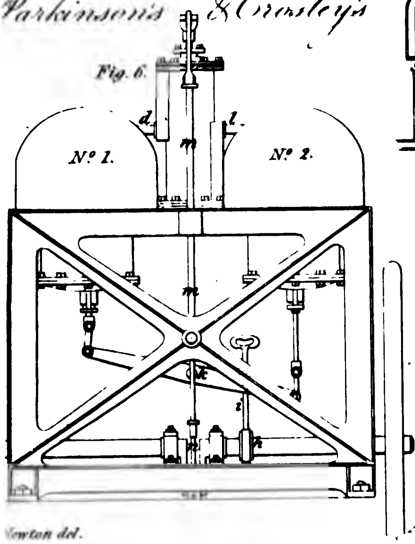
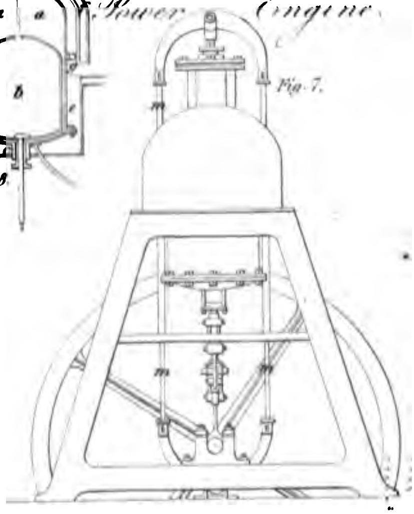
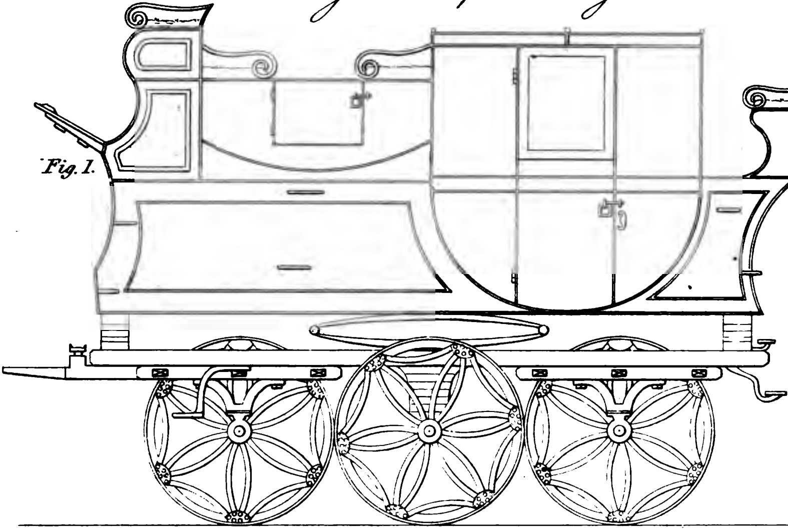


Fig. 7.



Burgess's Impd Carriage.

Fig. 1.



Jenour's Shot Cartridge.

Fig. 5.

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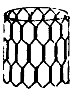

Fig. 2.

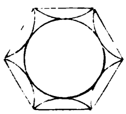

Fig. 3.

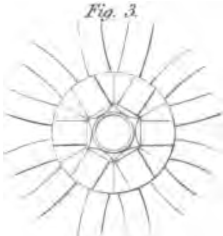

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Fig. 6.

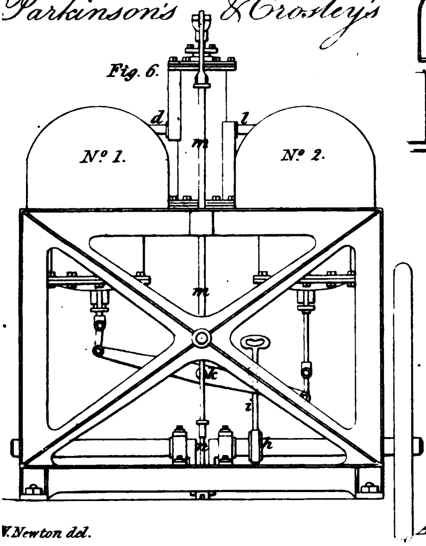


Fig. 8.

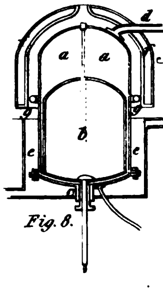
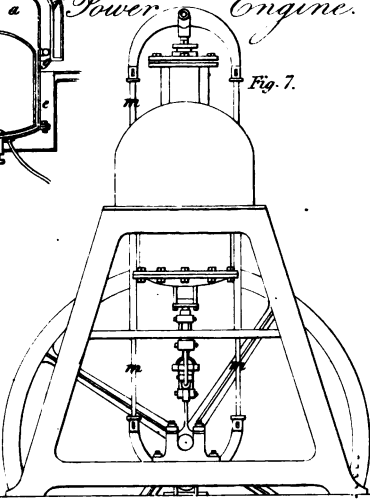
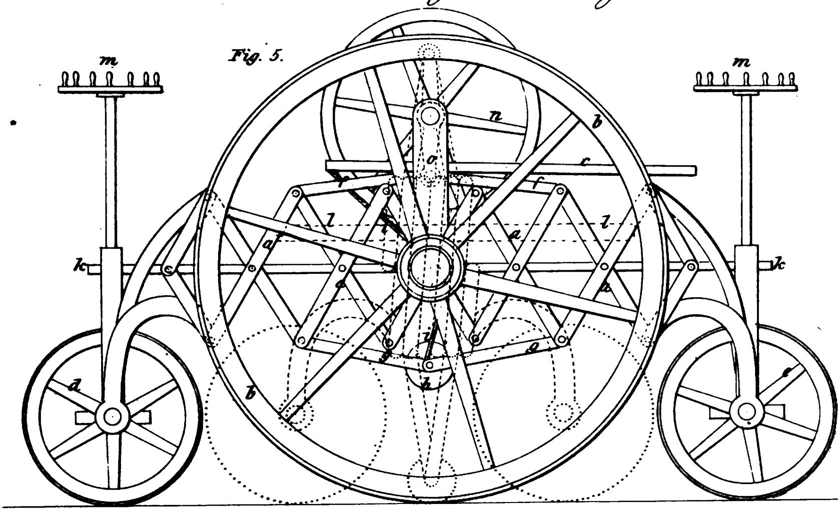


Fig. 7.



Hollond's Propelling Machinery.

Fig. 5.



Johnson's Appa.tus for evaporating.

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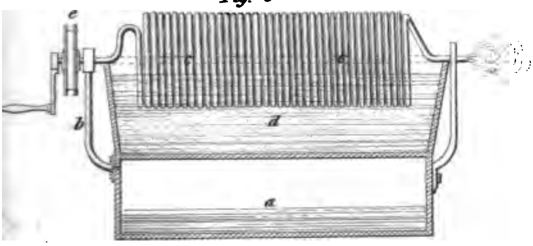
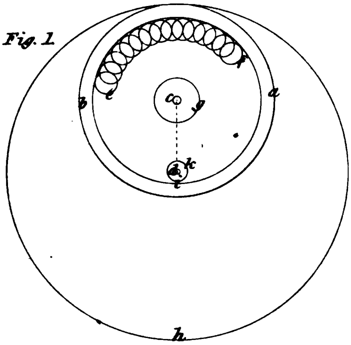


Shuttleworth's Excentric Chuck

Fig. 1.



Daniel's Cloth Dressing Appa.tus

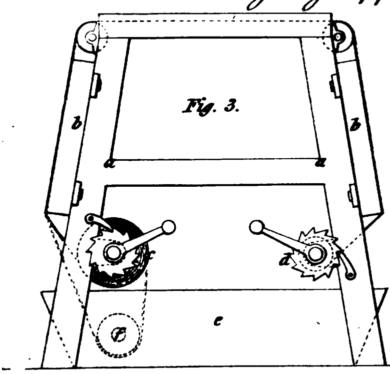


Fig. 3.

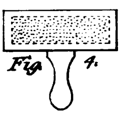
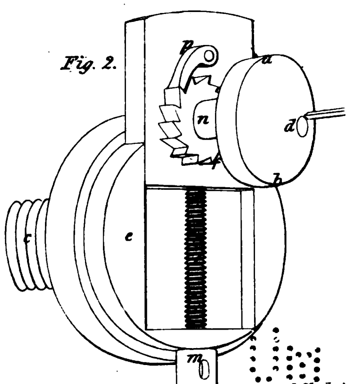


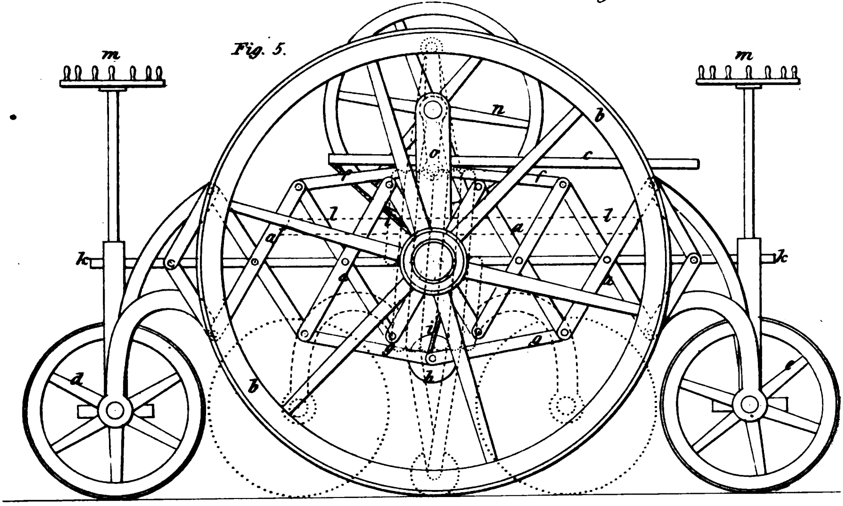
Fig. 4.

Fig. 2.



Hollond's Propelling Machinery.

Fig. 5.



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Johnson's Appa.ts for evaporating.

Fig. 6.

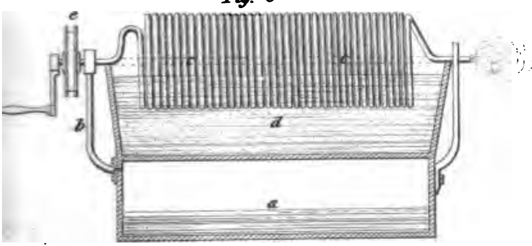
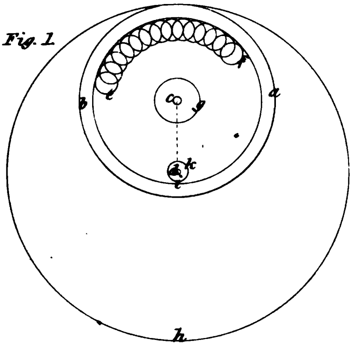


Fig. 1.



Daniel's Cloth Dressing Appa.ts

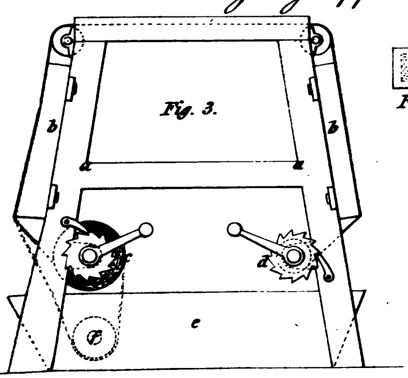


Fig. 3.

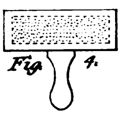
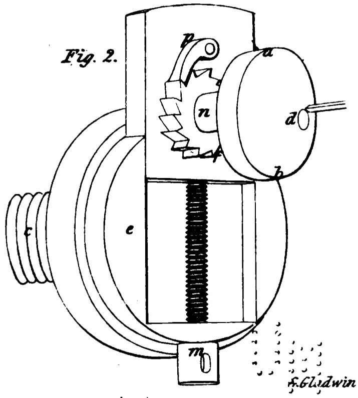


Fig. 4.

Fig. 2.



...ton del. 1st Septr. 1828. J. Gladwin sc.

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